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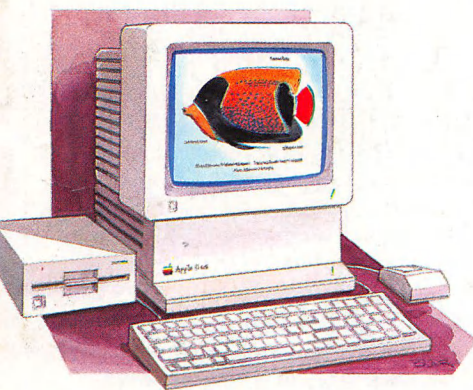
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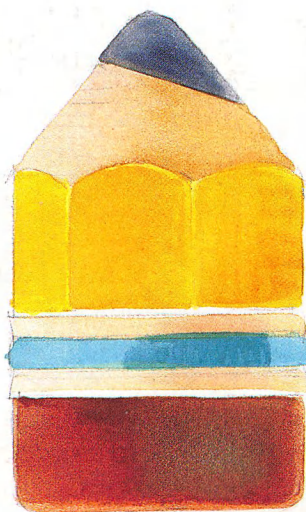
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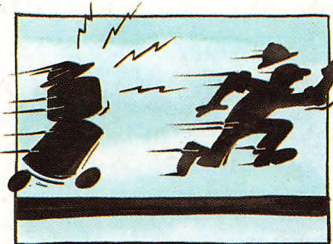
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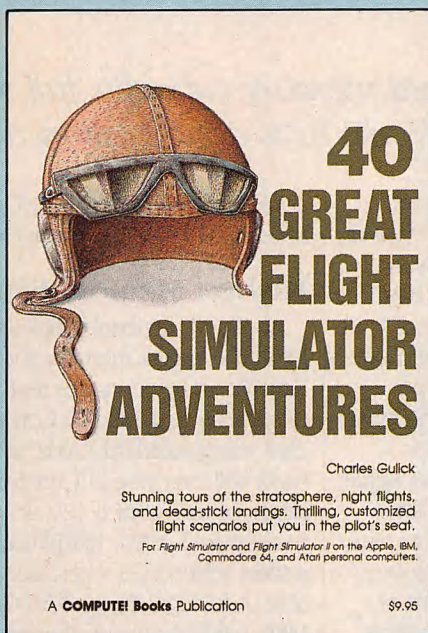


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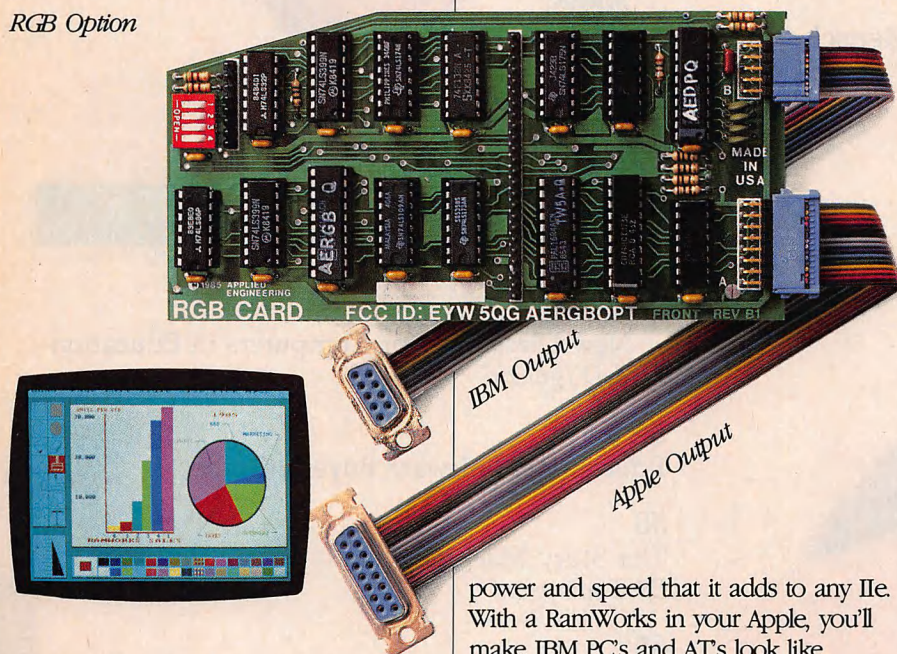
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Steve Wozniak, the creator of Apple Computer

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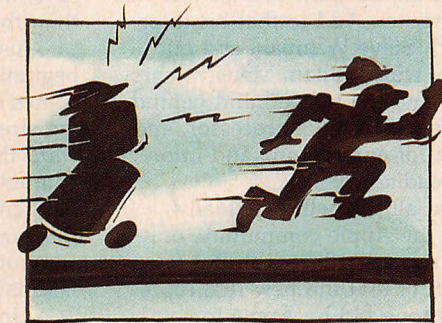
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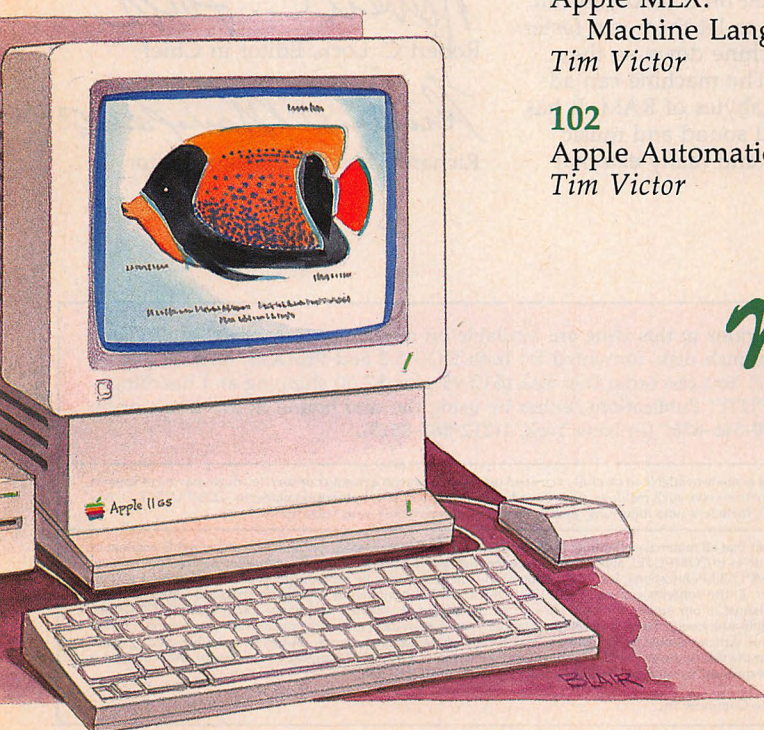
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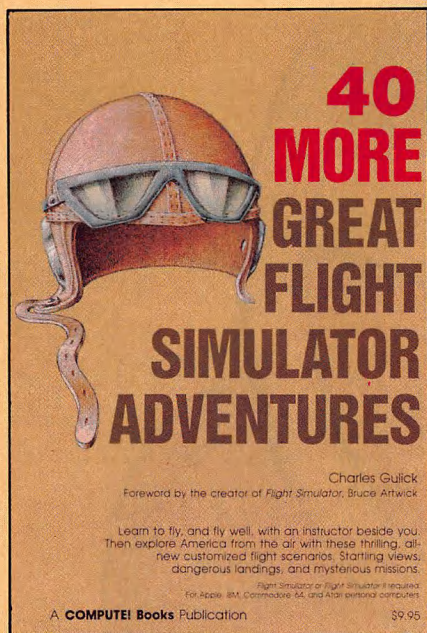




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# The New Apple IIGS Computer:

## A Hands-On Look

David D. Thornburg, Associate Editor

*Apple's new IIGS computer is the latest—and strongest—addition to the company's "Apple II Forever" campaign. Completely compatible with earlier Apple IIs, the IIGS offers exceptional advances in both graphics and sound (hence, GS). With a new 16-bit microprocessor (see "The Brains Behind the Brains" in this issue), 256K of RAM, and plenty of peripheral ports, the IIGS redefines the Apple II series in some amazing ways—and IIe owners can easily upgrade their machines to the IIGS.*

*No wonder it's Apple cofounder Steve Wozniak's favorite machine. Steve's comments accompany this article.*

It happens whenever a new computer hits the market. In a matter of weeks, sometimes days, you start to hear two criticisms.

*It doesn't use the latest technology.* That means the computer is compatible with earlier, similar machines. You heard this when computers like the Apple IIc, Commodore 128, and IBM PCjr were released.

*There's no software for the computer.* A bit harder to decipher, this means the machine uses some or all of the latest technology. The Macintosh, Commodore Amiga, and Atari ST fit this one.

Seems like a no-win situation, doesn't it? It was, until now.

Apple's recent announcement of the Apple IIGS, the latest addition to its original line, puts both those criticisms to rest. The IIGS is first and foremost an Apple II, and as such it runs nearly *all* of the Apple II software on the market today. Yet it's also a new computer that has its own advanced modes of operation—some of which eclipse the Macintosh in performance.

In short, the Apple IIGS is two machines in one—a product that bridges the gap between the Macintosh and Apple IIe, and in so doing poses what may be a

deadly threat to the Commodore Amiga and the Atari ST series.

### The Newest Apple

GS stands for *Graphics and Sound*—areas where this computer is most noticeably different from its other Apple II namesakes.

Anyone who's worked with the older II-series machines has had to contend with relatively primitive graphics and sound—capabilities that are a nostalgic remnant of 1970's technology. For instance, if two areas of the hi-res graphics screen were to be shaded with different colors, you had to be careful that the colors didn't "bleed." This further restricted an already small palette of colors, and made the Apple II pale in comparison to the eight-bit Atari and Commodore computers.

The built-in sound of the original II was even worse. There was only a speaker which could be "clicked" on and off by addressing a memory location. That some developers were able to create speech synthesis as well as music through this primitive port is miraculous. More modern designs, like those in the Atari and Commodore machines, provide dedicated sound processors that offer users control over the

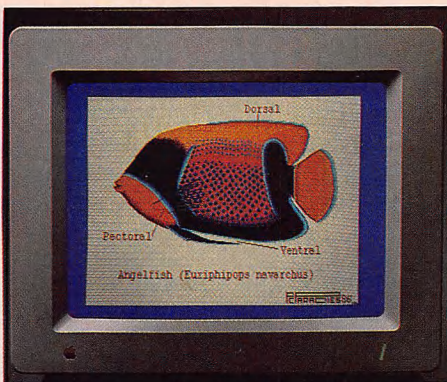


from resolution (although that has improved) as from the fact that the color choices are picked from a palette of 256 hues, each of which has 16 luminance (or brightness) levels. This gives you access to 4096 colors in all—a tremendous choice.

Apple also announced an analog RGB monitor that shows these colors in their best light. There are no restrictions on color placement. Color bleeding is gone forever.

The purity of the IIGS color display has to be seen to be appreciated. Apple chose to use a noninterlaced screen and the resultant picture is very easy on the eyes.

One side effect of the 16 luminance levels is the ability of the IIGS to display monochrome pictures with a true grey scale, rather than using halftoning techniques that trade off grey levels for resolution. As a result, digitized photographs look much better on the IIGS screen than they do on the Macintosh, where each pixel



Courtesy of Apple Computer, Inc.

*The AppleColor RGB monitor has a 12-inch screen with a resolution of 640 × 200 pixels. When used with the Apple IIGS computer, the monitor is capable of displaying graphics and text in as many as 4096 colors.*

is either "on" or "off," black or white.

Of course, the independent control of hue and luminance is not new to the personal computer industry—Atari was (to my

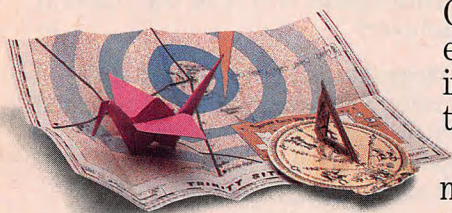
knowledge) the first to introduce this scheme to personal computers.

### An Ensoniq Sound Chip

If the IIGS graphics capabilities are good, the machine's sound capabilities are in a class by themselves. Rather than work with the (by now) ho-hum sound chips that provide simple ADSR (Attack, Decay, Sustain, Release) envelopes on sounds made from a small set of basic waveforms, the IIGS uses a custom 32-oscillator chip from Ensoniq similar to the one used in the \$1700 Mirage synthesizer. This chip is capable of generating 15 voices of music, allows excellent speech synthesis, accurately reproduces sampled sounds, and is provided with its own 64K of RAM so that music can be played in a background mode while other programs are running.

This chip alone justifies the price of the IIGS to many music fans and fanatics.

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and save your hide from a permanent spot in the freak show, you'll need to stretch your puzzle-solving skills to the limit.

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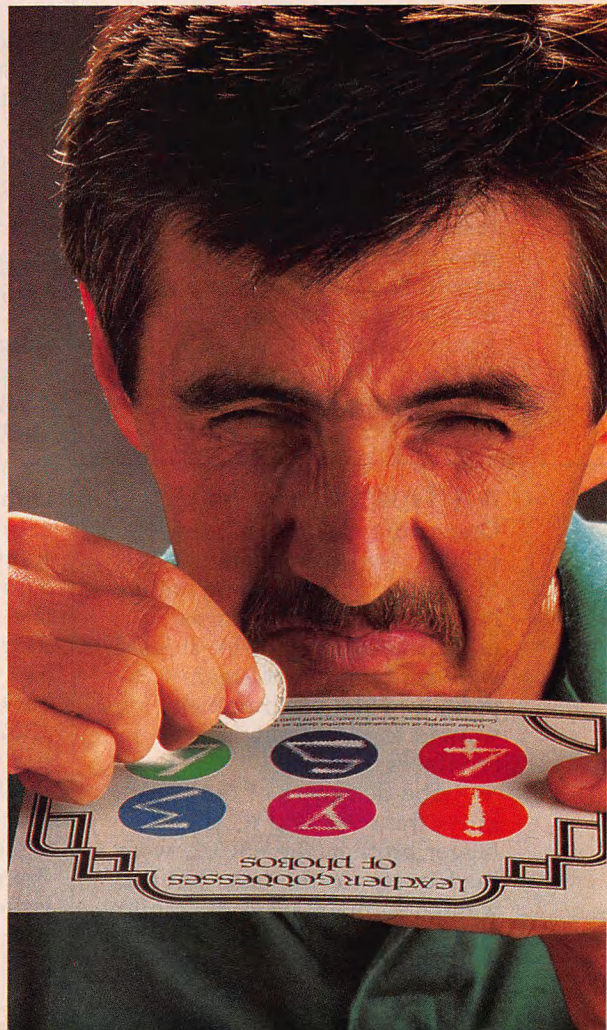
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you can take your IIe to your dealer and upgrade to a IIGS. Only the power supply, case, and keyboard are retained—the circuit board and basepan are replaced.

A closer look at the circuit board reveals a familiar set of seven peripheral card slots that accept the same plug-in cards used by the Apple IIe. But unless you have a lot of old cards lying around, you probably won't have to use any of these slots.

That's because the back panel already features a game/joystick port, a disk drive port (which accommodates up to six drives in either the 5¼-inch or 3½-inch format), two serial ports (including support for the AppleTalk network), composite video out, audio out, and the analog RGB video output. The remaining back panel port is the Apple DeskTop Bus—up to 16 keyboards and mice may be connected via this bus. (The IIGS is the first computer in the II line to be shipped with a mouse.) Expect to see a lot of interesting peripherals on the market that take advantage of this DeskTop Bus.

The circuit board contains 256K of RAM that can be expanded (through a built-in connector) to eight megabytes. The on-board 128K ROM can be expanded to one megabyte, another indication of the possible third-party support for this computer.

Several custom chips fill out most of the remaining real estate on the IIGS's circuit board. One of the most interesting is the "Mega II"—a chip effectively duplicating an entire Apple IIe or IIc. Don't be surprised to see this chip used to create a three- or four-chip Apple IIc someday soon.

Sound, graphics, and the Apple DeskTop Bus are each controlled with dedicated chips, shifting the burden from the microprocessor. The result is a computer that provides tremendous room for software development.

## Turbo II

The IIGS clock runs at 2.8 MHz, almost three times the speed of the Apple IIe. As a result, pro-

## The GS At A Glance

### Memory

256K RAM

Expandable to 8 megabytes

128K ROM

Expandable to 1 megabyte

### Graphics Modes

40 × 48 (Apple IIe/c low-res)

16 colors per scan line

280 × 192 (Apple IIe/c hi-res)

6 colors per scan line

560 × 192 (Apple IIe/c double-hi-res)

16 colors per scan line

320 × 200 pixels

16 colors per scan line

640 × 200 pixels

4 colors per scan line

### Colors

40 × 48 (Apple IIe/c low-res)

16 colors

280 × 192 (Apple IIe/c hi-res)

6 colors

320 × 200

4096 (256 hues, 16 luminances)

640 × 200

4096 (256 hues, 16 luminances)

grams designed for the older II-series machines run at close to three times their normal speed. This is an advantage for some programs, but not for others. Most players would be truly hard-pressed to set new records if games ran at three times their normal speed. To compensate, you can set the computer's speed to the "old" value with the IIGS's onscreen control panel. Games written for the IIe or IIc will then play at the correct speed.

The control panel also lets you set the color of the text and the background, as well as the pitch and volume of the internal "beep." Again, while this kind of control is familiar to owners of Atari and Commodore computers, it's a welcome addition to the Apple II line.

## What About Software?

At the time of this writing well over one hundred outside developers were actively engaged in creating software for the IIGS. By the time you read this, the number is probably triple that, with

### Sound

32-oscillator Ensoniq chip

15 voices

Speech synthesis

Reproduces sample sound

Dedicated 64K of RAM

### Microprocessor

65C816

16-bit processor

Clock speed—2.8 megahertz

Emulates 6502 for Apple

IIe/c compatibility

### Ports

Game/joystick port

Disk drive port

Accommodates up to six 5¼-inch or 3½-inch drives

Two serial ports

Support for AppleTalk

Composite video out

Audio out

Analog RGB video out

Apple DeskTop Bus

Connects up to 16 keyboards and mice

### Slots

Seven peripheral card slots

new entries being announced every day.

Apple itself, however, is conspicuous in its absence from these announcements. The company appears to be content to provide support for outside developers rather than dedicating its resources in aggressively developing its own programs for the IIGS.

There's good reason for this approach. Unlike the Macintosh—a computer released with no immediate third-party software support—the IIGS runs the vast library of Apple II programs. The IIGS is a machine that you can use from the moment you unpack it and set it up. As new products are developed to take advantage of the IIGS, people will move away from the pure Apple II software and toward the newer titles with their improved performance. **aa**

*David Thornburg is an associate editor with COMPUTE! magazine, a frequent contributor to other publications, and the designer of Calliope—an idea processor for the Apple IIe, IIc, the Macintosh, and now the IIGS. He may be reached in care of this publication.*



# Behind The Brains

## William Mensch, Microprocessor Pioneer

Selby Bateman, Features Editor

The brains behind a computer is its microprocessor. And the brains behind the brains is 41-year-old Bill Mensch.

Mensch's designs over the years have probably done as much as anything else to aid the proliferation of microcomputers. He was a member of the design team—at MOS Technology—that developed the 6502 microprocessor which is used in one form or another in Apple, Atari, and Commodore 8-bit computers. He designed the 65C02 that the Apple IIc uses, and most recently the 65816 that brings the Apple II family into the 16-bit computer world.

In many ways, Mensch's story is a fascinating history of one man's long-range vision—for himself and for his creations. Born and raised in the farm country of Bucks County, Pennsylvania, Mensch graduated from high school knowing plenty about hard work and farming—and nothing about electronics.

He enrolled at Temple University and studied to become a technician, since the university then had no engineering program. (In 1984, Mensch was invited back to be the Engineering Department's Alumnus of the Year.) Mensch jumped on the fast track right after college, joining Philco in its pioneering work on MOS (Metal-Oxide Semiconductor) technol-

ogy—the manufacturing process behind all microprocessors today. He later picked up an engineering degree at the University of Arizona and moved to Motorola, a leader in microprocessor research. There, he was on the design team that created the 6800 chip, the eight-bit predecessor to the 68000 microprocessor used in the Macintosh, Atari ST, and Amiga computers. He was also one of the design team members at MOS Technology when the company created the 6502 microprocessor.

A little more than eight years ago, Mensch started his own microprocessor design company, the Western Design Center in Mesa, Arizona. Since then, he's been involved in chip design for applications ranging from personal computers to advanced medical research.

The microprocessor world is a universe of microns, each of which represents the millionth part of a meter. Mensch is designing the equivalent of a small city—with miniature streets, bridges, buildings, and junctions—all of which must fit on a piece of silicon just a few microns thick and no wider than a small fingernail. This silicon wafer actually contains an intricate grid of microscopic transistorized circuits. And squeezed within this world must be the intelligence to let

the unit gather instructions from memory chips, execute those instructions, and store the resulting information back in memory.

Mensch is now doing for integrated circuit (IC) technology what he says Apple Computer has done for the microcomputer—making it less expensive and available for widespread personal use. Astonishingly, at a time when microprocessors are increasingly being designed on sophisticated electronic workstations by teams of engineers, Bill Mensch works alone on sheets of Mylar drawing paper.

He is now completing the design of a local area network on a chip, to be implanted in the human body. It will monitor and react to a wide range of physiological stimuli which affect functions ranging from those of the heart and muscles to hearing and even eyesight.

Many of us make indirect contact with Mensch every time we sit down at our Apple II, eight-bit Atari, or Commodore computer. At a time when much of the personal computer microprocessor publicity is directed at big names such as Intel (designers of the IBM PC microprocessors), and Motorola, Mensch is quietly providing Apple Computer with ways that it can make good on its slogan, "Apple II Forever."



# Q&A

**COMPUTE!:** How has the design process changed from when you first worked on the 6502 to the development of the 65816—is it a team effort, or is it primarily one or two people?

**Mensch:** Well, as it turns out, on the 6502 we had several people involved in the design and the definition of the product. GTE was involved with it. Apple was not involved with it.

On the 65816, I did the design of it. I had an associate company do some of the logic design on the 65C02. But on the 65816, I wanted to—you know, it's the old thing, I wanted to do it *my* way. I decided that I wanted to do something that would be kind of a special treat for myself and my sister—my sister Kathryn is my layout design manager. And so my sister laid out the entire 65816, and I designed the entire 816—did all the logic design and wrote the data sheets. I did all the test developments. I did everything that the engineer does on the program. So the 816 is, I believe, the only 16-bit microprocessor that has ever been designed by one engineer and laid out by one layout designer.

**COMPUTE!:** And who also happen to be brother and sister.

**Mensch:** Yeah, brother and sister on top of it. It ends up being a very special thing that we share.

**COMPUTE!:** How does the 65816 microprocessor relate to the earlier 6502 chip?

**Mensch:** The history of the 6500 series microprocessor starts with the 6502 that was NMOS [one of several versions of MOS] technology. We developed the 65C02 here at Western Design Center, and when we developed the 65C02 we also had the 65816 in mind.

**COMPUTE!:** When did you start work on the 65C02?

**Mensch:** In 1981. We delivered the first chips to Apple in the

spring of 1982. The 65C02 instruction enhancement has actually 29 instruction opcodes added to the original 6502 instruction set. [An *opcode* is a machine language command.]

Those new opcodes are meant to enhance its capabilities in the controls marketplace and also for some of the high-level language applications. Such as, in an Apple—the Pascal, [the BASIC] interpreter, things like this—run about 20 percent faster because of the new opcodes.

If you look at the old 6502 opcode matrix, you'll find that there are large areas of the opcode matrix available for improvement. Our goal on the original NMOS 6502 was for controls application. The personal computer didn't exist at the time, and therefore our focus was to deliver a product, a microprocessor, that could compete with the 4040 [an early microprocessor from Intel]. We didn't want to add in a lot of instructions that would increase the die size [the silicon chip size] because the cost of the chips is directly related to the size of the die.

So, we had a lot of discipline—while other competitors of the 6502 didn't show that discipline. The 6800 [a chip from Motorola]—you look at the opcode matrix and it's very well populated with instructions. It became almost impossible to put in an easy upgrade system in the 6800 system, and that's why you see Motorola went to a totally new architecture with the 68000.

Now, the [Intel] 8080 did the same thing, in that if you look at that opcode matrix you see that there's no migration path to 16 bits without having to [alter] the entire architecture. The [Zilog] Z80 represents the same problem. The Z80 is set up and uses most of the opcodes, and therefore extensions become 16-bit opcodes; 16-bit opcodes slow the machine down. The 65816 only has 8-bit opcodes. So that means that in each instruction we take less memory

because we stay with a single-byte opcode for the 65C02 and also, of course, for the 65816.

**COMPUTE!:** Which means that the 6502 was quite an expandable chip, relative to the others?

**Mensch:** That's right. It was planned originally to have upgrade paths back in 1975 when we developed the product. So, here we are in 1986, and I'm just finishing up a couple more chapters in the original concept, or plan.

**COMPUTE!:** And how does that affect the average Apple computer user?

**Mensch:** The end user, the guy who buys an Apple II or other products that use the 6502, what they get is the ability to upgrade their system without giving up their software. And when you have a plug-compatible part, it also means that you don't have to give up your hardware.

**COMPUTE!:** So, the overall goal of your efforts...?

**Mensch:** Our game plan is to upgrade the Apple IIe to a 16-bit capability, and then have the total technology capability to reduce the number of chips in the system or improve the performance of the system, or a combination of both, so that the user ends up with more value for the dollar.

**COMPUTE!:** And with no loss of compatibility.

**Mensch:** Right—total compatibility. We always have to stay with the compatibility.

**COMPUTE!:** If someone wanted to purchase a 65816 directly from you, what would be the cost?

**Mensch:** Our price is \$95.00 in single quantity. We realized there would be people interested in having single-piece quantities (for the people that have personal computers out there), so we set up a price that is not totally inconsiderate of the user.



**COMPUTE!:** You've touched on this, but what would you say the chief problem is in developing a compatible chip as you have with the 65C02 and now the 65816?

**Mensch:** The chief problem is, if you start off with the wrong processor, you're always going to be fighting the system. In other words, if it wasn't for the 6502 original concept, I would have been having a disaster of a time trying to do it.

So, one of the most significant problems in doing such a thing is: Are you starting from the proper base? And in the case of the 6502, we left all the doors open to do what I am doing. And that's the reason why you don't see the same upgrade capabilities with the eight-bit processors at Intel and Motorola.

**COMPUTE!:** How difficult is it to achieve compatibility in a microprocessor?

**Mensch:** The chief problem that exists in maintaining the compatibility going from the 65C02 to the 65816 was forcing the discipline of total compatibility—meaning the same number of cycles in the instruction, the same construction of the instruction, the same architecture of the instruction. That meant that I had to add some logic in there for emulation.

And when we talk about emulation, we have to be able to do interrupts the same way; we have to be able to handle the data going onto the stack and returning from the stack. You've got to protect the user from disasters which could occur because somebody in their application modified memory. When they did a return from interrupt, they could've changed the status registers and things like this.

So, those kinds of areas are very detail-oriented. In the case of an Apple computer, as an example, the way that [Apple co-founder Steve] Wozniak did his disk controller, we had to make modifications because of the way that the disk controller works.

The compatibility has to do with some of the details of the cycle timing and other things like that, that's the most important.

**COMPUTE!:** The clock speed of the 65816—is it about 4 megahertz?

**Mensch:** Yes. Our typical product is 4-megahertz. We sell 2-megahertz into the retrofit market, but our typical run-of-the-mill is 4-megahertz. And that's at the 3-micron level. At 2.4 microns, which we're developing right now, our typical part looks like it's around 6-megahertz. [By comparison, the clock speed of the 6502 is between 1 and 2 megahertz, depending on the computer you use.]

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**“The 65816 is  
the only 16-bit  
microprocessor  
ever designed by  
one engineer  
and laid out by  
one layout  
designer.”**

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**COMPUTE!:** Is that also possible to speed up? Are you working on that?

**Mensch:** Yes. What we're doing on that line is, in the 2-micron technology, we're just now getting first silicon out. We're just now evaluating the first functional products. Once we have that evaluated, then we'll know some things that we can do to modify the process so that we can get higher speed. The other thing that we're doing is, we're running the same design at 1½-micron technology, which should yield approximately a two-times performance increase. So if we're looking at a typical 4-to 6-megahertz now, we'd be looking

at a typical 8- to 12-megahertz.

**COMPUTE!:** At what point do you run into problems with increasing the speed?

**Mensch:** We see right now a standard off-the-shelf RAM of 6–8 megahertz as the upward limit because of the memory technology. Now, the reader should be familiar with what we're talking about—6 to 8 megahertz—you've heard 4-megahertz, 6-megahertz, 8-megahertz IBM PCs, something like that.

**COMPUTE!:** Right.

**Mensch:** Well, the 65816, when it runs at the same speed as the Intel processors—meaning the 8086 and the 80286 or the 80386—one of our bus cycles equals four of theirs. That means that when we talk about 6 megahertz, that's equivalent to the IBM PC running at 24 megahertz.

Readers are always dazzled by the speed. Motorola talks about 12 megahertz. The Apple [Macintosh] computer has about 7 megahertz with the 68000. The equivalent speed on the 65816 would be in the neighborhood of 2 to 3 megahertz.

In other words, a 2- to 3-megahertz Apple [II-series] has the same kind of performance as an 8-megahertz Macintosh.

**COMPUTE!:** What caused you to establish the Western Design Center?

**Mensch:** I established the company in May of 1978, so we're a little more than eight years old now. I founded the company because I needed to be able to, let's say, express my IC design concepts without restriction.

I worked for Motorola. I was one of Motorola's inventors of their microprocessor system. I worked for MOS Technology before—and when they were acquired by Commodore, where we developed the 6500. And, I had a chance to contribute significantly on the 6502, obviously. I'm one of the people that invented that product.

However, when it came to next-generation, we were thinking 16-bit in 1976. But, obviously, we didn't do it. We were thinking



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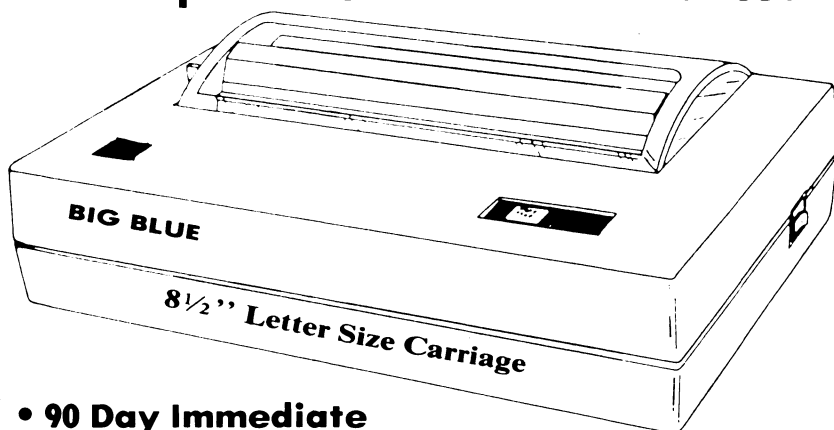
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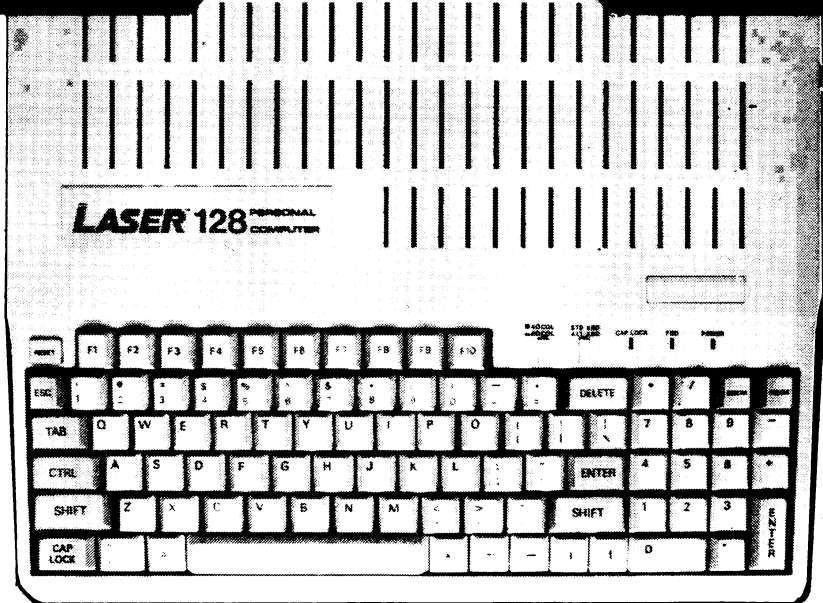
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one-chip application-specific ICs [integrated circuits] in 1976, because I was designing one. But then that was dropped.

In other words, when you're working for a company like that, you should obey your management and do what they want to do. And when Commodore acquired MOS Technology they wanted to do game-type products. So, therefore, they got away from the microprocessor concepts and went to game systems. All of that meant that there wasn't too much in new ICs required, for the area of expertise that I had experience in. So I ended up saying, well, I want to do more of these things and the only way I can do more is either strike out on my own or go to a company that would want to do these things.

I got the opportunity to start Western Design Center when Jack Tramiel wanted me to develop some CMOS calculator ICs. So, that's what I did. In 1978, I founded the company and we designed a calculator IC in CMOS for Commodore. After two and a half years of working with Commodore, we parted ways. That was in 1980. In 1981, I embarked on the 65C02 development and at the same time defined the basic concepts of the 65816. And in 1982 I delivered first silicon on the 65C02, and in 1982 I also began development of the 65816.

**COMPUTE!:** On the 65C02—did you approach Apple on that?

**Mensch:** I never talked to Apple. I never talked to any personal computer company, believe it or not, when I developed the 65C02. And I don't know why. It just was the way it happened.

As it turns out, the first chip I developed was a one-chip microcomputer used in telephones today. And that has a 65C02 in it. GTE manufactures that, called the 65SC150. It has modem features and dialing features built into it.

So, you see, the first actual development on the 65C02 was a one-chip microcomputer and not the 65C02 itself. I developed the 65C02 on my own budget, because I felt there was a need for such a thing. Commodore's direction did not want or need a

CMOS 6502. They did not want or need a 16-bit version of it.

They didn't have the motivation. They didn't have the desire, the willpower, or whatever else it takes—and I did because I was trying to survive in a little company. So basically speaking, I founded the company along my design expertise. Where I'm going right now with the company is that we're on the threshold—or we're through the door, so to speak—on a complete concept. Western Design Center is the forerunner, or at least it appears to be the forerunner, in microprocessor

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“...A 2- to 3-megahertz Apple [II-series] has the same kind of performance as an 8-megahertz Macintosh.”

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technology in CMOS in [terms of] applications-specific core microprocessor use and licensing.

**COMPUTE!:** Does that include manufacturing as well as designing?

**Mensch:** We have no intention to have a factory of our own. The reason why we don't want to have a factory of our own is because we believe the number of factories that are going to exist in the future is probably limited to 10 in Japan, and probably 10–20 in the United States, and probably 10 in Europe. So, we're talking about 30–40 serious semiconductor factories in the world, and I don't know where you're going to find the money to compete against those kinds of companies. Therefore, it would be

a bit foolhardy to think that I'm going to raise a half-billion dollars to get a factory and then fund it with design. I don't think that'll work.

My strategy, then, is to work with these 30 factories and license them on my microprocessors, and as a result have a favorable situation where I can buy [silicon] wafers from them. And that's what I'm doing.

**COMPUTE!:** Where did Apple Computer get your 65C02 for the Apple IIc computer?

**Mensch:** They bought directly from my licensees, GTE and NCR. On the 65816, they [Apple] buy chips from me for evaluation purposes—we can't talk anything more than that right now. [At the time of this interview, Apple Computer had not announced the Apple IIgs, so Mensch was not permitted to say anything about the company's use of the 65816 chip—Ed.]

But anyhow they buy chips from me, and also my licensees. And we have many customers that do the same.

**COMPUTE!:** Has the cost of chip development changed from your standpoint, or is it pretty much the same?

**Mensch:** Well, it's pretty much the same. I think where we see a lot of activity occurring is in the design workstations. The design workstations are trying to reduce the cost of the [chip] development. But it's been my experience that they *increase* the cost rather than reduce it because of the cost of the tools. You have to absorb the cost of the tools—and then what you have are people needing to be trained in the basic skills of the technology and also the skills of working with the tools. So it's really a delaying mechanism rather than a speeding-up mechanism for the first development. After you've developed a couple of ICs with the new tools, then you begin picking up speed. But sometimes that's too late.

The 816 and the C02 were designed on Mylar, which is our drawing paper that we use, and we use blueprints to make copies of it. We do not use online





*Western Design Center's  
65816 microprocessor chip, the  
brains of the IIGs, Apple's newest  
personal computer.*

design—like some of the big companies use—meaning that they design it on the CRT [cathode ray tube]. We don't do that, and we did not do logic capture or anything like this where we actually captured the logic on a workstation.

#### **COMPUTE!:** Why is that?

**Mensch:** Well, like I was saying, it slows you down. And so, we didn't have the the expense. It would cost money to do that. We didn't have the resources to buy the latest tools either. At the same time, it's very easy to draw a picture of what you want and then do it. And what you find right now is, the successful companies are still doing it the old way—they work at it. In other words, they use blueprints, they use hand-drawn things; they still use those methods. Now it's changing, but it's not going as fast as the marketing organizations of the workstation companies would like to believe.

**COMPUTE!:** What are you currently working on?

**Mensch:** One thing I want to mention is that we are in the final stages of development on an applications-specific IC that is meant to save lives. It's going to be implanted in a human being, and it's actually a local area network to be implanted in the human body.

**COMPUTE!:** It would serve as a monitoring system?

**Mensch:** It's a monitoring and also stimulus system, meaning

that it monitors body functions and it also stimulates body functions, one of which is obvious—the heart. Other things are muscles. Other things are hearing assistance devices, and others will be sight-assistance devices. With this local area network, we can hang eight processors on it.

My next microcomputer that I'm doing is 16-bit with the 816 on it and I'm hoping that gets used in synthesized vision. It will also have an implantable local area network on it. So, you can see also the range of applications.

In other words, the attempt is to come out with a range of capabilities that surpasses all previous technology. You can't put a 68000 inside a human body—it's just not feasible. You can't put a 68020 in there either because it's just impossible—there's too much power. But my 65816, which can compete against the 68020, can. And it's also compatible with all the libraries for controls of such sophisticated devices from the 65C02 core. Compatibility, you see, starts paying off.

**COMPUTE!:** What other projects are you working on that grow out of your design efforts?

**Mensch:** We're developing applications-specific ICs. And we're using, in the Apple II, low-cost personal computers to develop the ICs. I'm a visiting professor of computer science at the University of Strathclyde in Scotland, and we're looking at putting together a team where we develop the ability to do the layout graphics for ICs—the graphics

editors and also the other design tools—using an Apple II as a platform.

Obviously, it would be a 65816-based Apple II. Anyhow, the idea here is that we want to come out with a full set of tools using the 16-bit Apple II as the platform. And, like I mentioned, if it's still proprietary information, then we could use a board rather than use a 16-bit version of the Apple that Apple would supply. We have either way of going and it would be just as beneficial either way. Now, that means that we hope to, or plan to, develop a system that would have sufficiently accurate graphics on it—meaning resolution—that we can design ICs for under \$10,000. The workstation would cost less than \$10,000, and that's the hardware and software included. Now, if you go out and price the workstations right now you'll find that they're about a hundred-thousand dollars. You've got a ten-to-one cost reduction.

When we're done, we're delivering what I think the world wants. In a final analysis, we're doing the same thing for the integrated circuit technology as Apple did for the computer technology. We're reducing the expense and improving the performance, meaning that the cost and performance ratios allow you to do the same thing but with a personal budget.

You see, it all ties together.

**COMPUTE!:** What does the future hold for you and for the Western Design Center?

**Mensch:** Often, I'm asked if I'm going to sell out to a bigger company. If you look at what I'm trying to do in my own way, and it could be considered small or big, it depends on what history will show. But by keeping it in an independent fashion this way, I believe that I offer more to the general society than if I was to be gobbled up by some bigger company.

That kind of freedom of technology, and making and keeping it interesting for myself, I think, should just be a spark of sunshine in an otherwise sometimes dreary industry.

**aa**



# New On The Wire

Arlan R. Levitan

*Telecommunications, like every other area of computing, is constantly changing. Of special interest to personal computer users are some recent developments in commercial information services and the new, high-speed modems.*

If you've just bought a modem or terminal software for your computer, you've probably found several offers from commercial information services packed along with your purchase. Services such as CompuServe, The Source, Dow Jones News Retrieval, and Delphi often advertise this way.

Each of these services has been around for at least five years—a long time in the world of online computing. The Big Three (CompuServe, The Source, and Dow Jones) provide similar features and information for comparable prices. Delphi, on the other hand, is more limited in scope and aggressively undercuts the others' rates with its \$6/hour connect rate for off-prime time 300- and 1200-bps use.

The last two years have seen a half-dozen or so new telecomputing-related services come and go. Among the survivors are reasonably priced alternatives that give modem mavens on a budget more choices than ever before.

## GENie

GENie is considered by many telecomputing regulars to be the most promising of the young turks on the information service scene. It has a reputation that's been earned by rapid expansion of services, low connect-time charges,

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The microcomputer-to-host interplay required to transfer program files using error-correcting protocols such as XMODEM usually has a significant impact on the actual speed of the file transfer. It's not unusual for a 1200-bps-modem file transfer from an information service to have an actual throughput of 600 bps or less. The overall speed of the transfer is also typically affected by how busy the host is. The more users logged on, the greater the delay.

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days) for 300- or 1200-bps access. There is a one-time registration fee of \$18.

You can get a free demo and register online for GENie by setting your terminal software to half duplex (local echo) and dialing 1-800-638-8369. When connected, type HHH and press the Return key. At the U#= prompt, enter XJM11999,GENIE and hit Return again.

## People/Link

What American People/Link lacks in breadth of services is made up by the low cost and spunky attitude of its adherents and administrators.

People/Link (Called P-Link by its users) has had its share of growing pains. Its birth was rife with frequent system outages and troublesome system software. User criticism was kept to a minimum by \$2.95/hour connect charges during the early days. While rates have risen of late, P-Link is still a relative bargain at \$4.25/hour, with no surcharge for 1200 or 2400 bps, and occasional "happy hours" that offer online chat for the old \$2.95 rate. There is a one-time sign-up fee, which is currently \$10. Though P-Link's growth has been slow, the addition of good electronic mail and special interest group facilities make P-Link a good, reasonably priced telecomputing alternative.

One-hour demos of People/Link are available via modem from 1-800-826-8855 (in Illinois, 312-822-9712). You can also request an information packet be sent to you by connecting with the system. For additional information, you can contact P-Link's



customer service representatives at 1-800-524-0100 (in Illinois, 312-870-5200).

### PC Pursuit

Privately owned and operated computer-based Bulletin Board Systems (BBSs) are many telecomputing buffs' primary source of public domain programs and technical information. There are literally thousands of BBSs in operation across the country. Until the advent of General Telephone's (GTE) PC Pursuit service, computer hobbyists either limited their calls to local BBSs or paid hourly long distance charges to access systems in remote cities.

PC Pursuit gives the avid telecomputer virtually unlimited access to bulletin board systems (or any other dialable computer) in fourteen metropolitan areas during non-prime time (6 p.m. to 7 a.m. weekdays, major holidays, weekends). As of this writing, Atlanta, Boston, Chicago, Dallas, Denver, Detroit, Houston, Los Angeles, Newark, New York City, Philadelphia, San Francisco, Seattle, and Washington, D.C. are accessible from PC Pursuit. The \$25 registration fee and monthly charge of \$25 for the service may seem high to some, but regular BBS callers recognize Pursuit as a bargain for the "hooked on modems" crowd.

PC Pursuit comes in two flavors. The original version of PC Pursuit requires that the subscriber (typically a resident of one of the fourteen areas in the pursuit network) call a local number. A PC Pursuit computer at the local number asks the caller for the phone number his or her computer is attached to, and the city and number of the remote BBS. The BBS (or other computer) being called must also be located in one of the fourteen PC Pursuit cities. The PC Pursuit computer then hangs up, calls back the number of the Pursuit subscriber, and once connected with the subscriber's computer, places a call through the PC Pursuit network to the remote BBS.

A second implementation of Pursuit has been recently offered for those who want to use the ser-

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Flowers



Bamboos



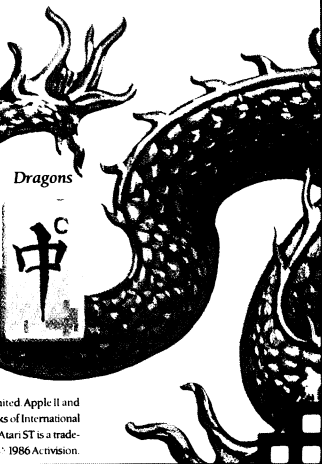
Characters



Seasons



Winds



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Modem	Manufacturer	Computer	Internal/External	Card Required (Apple II)	Autosw Answer	Autodial	Cables Included	Terminal Software Included	Command Set	Warranty	Price	Comments
AX/2400	Microcom	Apple, Mac	External	Serial card	Yes	Yes	No	No	Hayes, Microcom SX	One year	\$749	Offers MNP Class-4 error-checking protocol to insure error-free transmission.
Courier 2400	USRobotics	Apple, Mac	External	Serial card	Yes	Yes	No	No	Hayes	Two years	\$699	External switch lets you reverse the function of pins 2 and 3.
DCA 911	Digital Communications	Apple, Mac	External	Serial card	Yes	Yes	No	No	Hayes	90 days	\$795	Front-panel push-button switches control data or voice transmission.
Lightning 24	Anchor Automation	Apple, Mac	External	Serial card	Yes	Yes	No	No	Hayes	Five years	\$499	Buffer serves as telephone redialer
Macmodem 2400	Microcom	Mac	External	—	Yes	Yes	Yes	Yes	Hayes	One year	\$999	Includes Macmodem telecommunications software.
Maxwell 2400V	Racal-Vadic	Apple, Mac	External	Serial card	Yes	Yes	No (Option for Mac)	No (Option for Mac)	Hayes, Racal-Vadic	Two years	\$595	Optional CommuniKit for the Macintosh includes cable and MacGEORGE telecommunications software.
Model 3124EH	MICOM	Apple, Mac	External	Serial card	Yes	Yes	No	No	Hayes	One year	\$599	Uses Microcom's proprietary MNP error-checking protocol.
Professional 2400	Novation	Apple, Mac	External	Serial card	Yes	Yes	No	Yes (Mac only)	Hayes, expanded	Two years	\$795 (\$895 w/ software)	Attractive modem with LCD front-panel display instead of LED lights.
ProModem 2400	Prometheus	Apple, Mac	External	Serial card	Yes	Yes	(Mac only)	(Mac only)	Hayes	One year	\$595	Modem buffer (to 512K) available as option.
ProModem 2400G	Prometheus	Apple, Mac	External	Serial card	Yes	Yes	(Mac only)	(Mac only)	Hayes	One year	\$549	Nonexpandable version of the 2400 series.
Smartmodem 2400	Hayes	Apple, Mac	External	Serial card	Yes	Yes	No	No	Hayes, expanded	Two years	\$899	As "Hayes-compatible" as a modem can get.
224A/D	Universal Data Systems	Apple, Mac	External	Serial card	Yes	Yes	No	No	Hayes	One year	\$575	Nonvolatile battery-backed memory. Automatic dial and log-on for up to ten numbers.
2400PA	Racal-Vadic	Apple, Mac	External	Serial card	Yes	Yes	No	No	Hayes, Racal-Vadic	One year	\$795	Stores up to 15 telephone numbers in nonvolatile memory.

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vice from multiple locations. "Son of PC Pursuit" uses a more traditional user-code/password scheme that works over the regular GTE Telenet network. Since the new version of Pursuit is not dependent on the subscriber having access to a local PC Pursuit computer, it can be used by anyone with a local Telenet access number. Subscribers who are using the original method may opt for the more recent version instead by requesting the change from GTE.

As slick a concept as PC Pursuit may be, it does have some drawbacks. The original implementation of Pursuit is a little pokey, tending toward an overall throughput rate of 650-750 bps over a 1200-bps connection. The newer implementation is even slower, clocking in at 350-450 bps over a 1200-bps link.

You can get more information on PC Pursuit via a special computerized bulletin board at 1-800-835-3001 (in Virginia, 703-689-2987). If you want to talk to a person about the service or



## The Bits Get Faster

Two years ago 300-bps (bits per second) modems were top-of-the-line devices. No one really saw a need to transfer information any faster than that.

Today, a 300-bps modem is almost an antique. Modems that transmit and receive at 1200 bps, four times faster, have become the norm.

The phrase *time is money* has never been demonstrated more vividly than in the world of telecommunications, where the longer you stay online with a commercial service, the more you're charged. Power telecommunicators—or anyone else interested in paring down their monthly connect charges—are interested in

getting online, downloading programs or data, and getting offline, all as quickly as possible.

That's why more and more 2400-bps modems are appearing alongside Apple and Macintosh computers. A 2400-bps modem can theoretically transfer information twice as fast as a 1200-bps device, halving the long distance or connect charges.

A year ago you had to search hard for a 2400-bps modem, and look even harder for databases which supported that speed. No longer. Now almost every major commercial service and many bulletin boards offer 2400-bps connections (although sometimes at a premium price).

And as you can see in the list, the major modem players are offering 2400-bps modems.

register, you can call 1-800-368-4215 (in Virginia, 703-689-5700).

### The WELL

Interested in a counterculture online experience? Do you fondly remember the *Whole Earth Catalog* publications of the late sixties that were cornucopias of useful and unusual information? If so, an off-beat service called The WELL may be just your cup of ginseng tea. The WELL is a low-cost, computerized conferencing system for the San Francisco Bay Area run by Stewart Brand and the rest of the gang who make up the *Whole Earth Catalog* and *Whole Earth Review* in Sausalito, California.

The WELL includes private electronic mail, computerized conferencing, and online "chat." For those brave souls who eschew friendly user interfaces, the WELL also offers access to the system's underlying UNIX operating system. There's also USENET, another layer of conferences available from the UNIX substructure itself. USENET is a nationwide conferencing system that links hundreds of commercial and educational UNIX systems. Many users subscribe to The WELL system for USENET access alone.

The WELL costs \$8/month plus \$3/hour. Would-be WELL users not in the San Francisco area may choose to access The WELL via a long-distance call or PC Pursuit. The WELL may also be accessed through the UNINET public network (service:WELL) for a \$6/hour surcharge.

You can use your computer and modem to register on The WELL by calling (415) 332-6106, and typing **newuser** at the *login:* prompt.

aa

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- ✓ 40/80 column support\*
- ✓ Powerful Text Editor
- ✓ Simplified, fast compile, Link and Execution
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Signature X _____	Send to: Micol Systems, 9 Lynch Rd., Toronto, Ont. Canada M2J 2V6 or call: Toll Free 1-800-268-1121 operator 16.

\*Requires an Apple II+, IIe, or IIc, min. 64K RAM, one disk drive. ProDOS supplied on disk. Does not function under DOS 3.3. VIDEX 80 column cards supported. Applesoft is a registered trademark of Apple Computer Inc.



# Mastering Microsoft Works

Sharon Zardetto Aker

*Microsoft Works, one of the most powerful and versatile software packages to appear for the Macintosh, has just made its appearance. Works—an integrated combination of word processor, database, spreadsheet, graphics, and telecommunications—is simple to use, but complex in its depth. This excerpt from Aker's recently released Mastering Microsoft Works (COMPUTE! Books) gives you a taste of what Works can do.*

## *The Word Processor*

Works's word processor is a hybrid, a cross between the bare simplicity of MacWrite and the impressive complexity of Microsoft Word. All the standard word processor features are here, and then some. You can write, edit, cut and paste, print, and more. And since Works can have up to ten windows open at once, merging documents and making revisions from one draft to another is simplified. You don't have the formatting control that you do in Word, but other features make up for it. The Draw option is especially interesting and can be put to a multitude of uses. Here, Aker illustrates just a few.

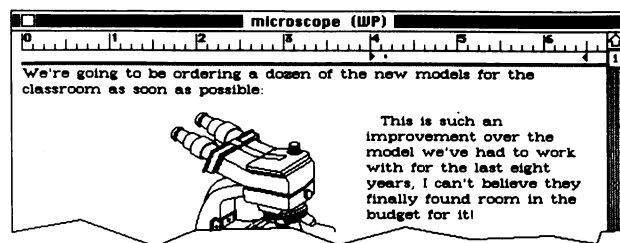
## Adding Text

One of Works's unique features is the way it lets you combine text and graphics in a document.

It's the first Macintosh word processor which handles graphics and text in a way that lets you overlay them on the screen. You can type text to the right or left of a picture, or even within a picture.

To add text to a graphic section, just click the cursor and start typing. The regular ruler margins apply to the typing, so if you want to type to the right of a picture, you either have to set the left margin accordingly or use the Tab key or the space bar to move the cursor to the desired spot.

Figure 1: Mixing Text And Graphics



*Add text to the right or left of a picture by setting the text margins at appropriate spots.*

The text and graphics, although combined visually on the screen, are separate components of the document. Deleting a picture leaves the text in that area. Dragging the cursor down the left side of the document—as if you were selecting a large block of text—highlights any

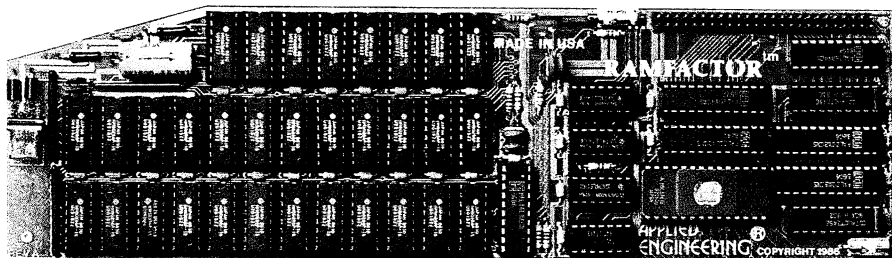


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With RamFactor, you'll be able to instantly add another 256K, 512K, or a full 1 meg on the main board and up to 16 meg with additional piggyback card. And since virtually all software is automatically compatible with RamFactor, you'll immediately be able to load programs into RamFactor for instantaneous access to information. You'll also be able to store more data for larger word processing documents, bigger data bases, and expanded spreadsheets.



## Very Compatible

All the leading software is already compatible with RamFactor. Programs like AppleWorks, Pinpoint, BPI, Managing Your Money, Dollars and Sense, SuperCalc 3A, PFS, MouseWrite, MouseDesk, MouseCalc, Sensible Speller, Applewriter IIe, Business Works, ReportWorks, Catalyst 3.0 and more. And RamFactor is fully ProDos, DOS 3.3, Pascal 1.3 and CP/M compatible. In fact, no other memory card (RamWorks excepted) is more compatible with commercial software.

## AppleWorks Power

There are other slot 1-7 cards that give AppleWorks a larger desktop, but that's the end of their story. But RamFactor is the only slot 1-7 card that increases AppleWorks internal memory limits, increasing the maximum number of records in the database and lines permitted in the word processor, and RamFactor is the only standard slot card that will automatically load AppleWorks into RAM dramatically increasing speed and eliminating the time required to access the program disk, it will even display the time and date on the AppleWorks screen with any ProDos clock. RamFactor will automatically segment large files so they can be saved on 5¼", 3½", and hard disks. All this performance is available to anyone with an Apple IIe or II+ with an 80

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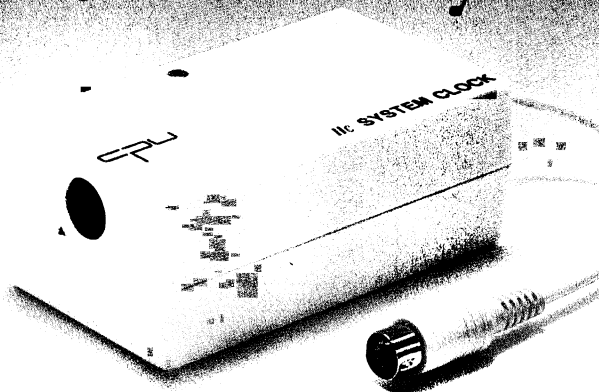
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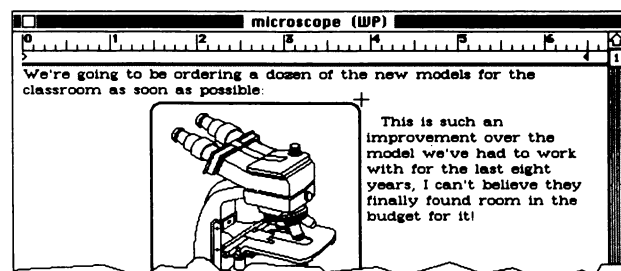
picture, but deleting the block erases only the text. You must delete graphics and text separately.

## The Draw Option

Another of *Works's* very special options is its Draw feature. You can add lines or frames to any segment of your document. The frames come in three shapes—circles, boxes, or boxes with rounded corners. Both frames and lines can be drawn in any of three thicknesses.

Selecting **Draw** from the Edit menu presents a dialog box which lets you choose your drawing options. Click OK, and the dialog box disappears and your cursor changes to a crosshairs pointer. Click on the spot where you want the line or shape to begin and drag to the spot where it should end.

**Figure 2: The Frame**



*Drag the drawing cursor from one spot to another to draw a shape.*

You can underline or frame important parts of your document with the Draw feature, or even add frames or lines to graphics. And, since you can draw numerous line segments, you can construct arrows, dotted lines, and the like.

To exit the drawing mode entirely, just choose **Draw Off**. To switch to another drawing option, you have to select **Draw Off**, then **Draw** again. (A shortcut to switching the drawing options is to hold down the Command key and press the D key twice.)

Lines and boxes that you add to your document are treated like other graphic elements—they're overlaid on the text (or on other pictures). To delete them, click the cursor on or near a drawn figure, and choose **Select Picture**. Choosing **Select Picture** again highlights the next picture or graphic element. Once selected, an item created with the Draw option can be moved and resized just like any picture.

## Putting The Word Processor To Work

You can design a letterhead for your business or personal use with *Works's* Draw option.

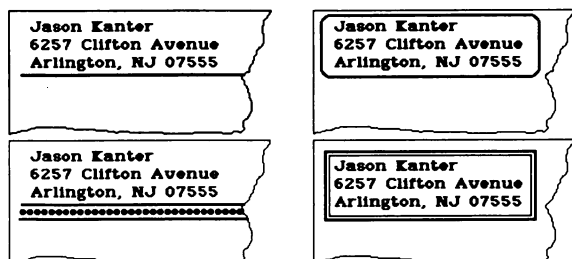
A simple thick line separating your name and address from the body of the letter gives a



clean look to your correspondence. You can vary this theme by using multiple lines or by using Option characters (like the bullet entered when you press Option-8) between the lines.

Other variations include enclosing your address, or the recipient's name and address, in a rectangle or rounded rectangle.

Figure 3: Letterhead Possibilities



Draw can be used to make simple, but interesting letterheads.

Since drawn lines are printed in High Quality, just the way text is if that option is picked, the end result is quite pleasing. Pasted-in graphics cannot be printed in High Quality, so it's best to avoid them for such basic things as letterheads when you're working with the ImageWriter printer. (You don't have to worry about this if you're using the LaserWriter or LaserWriter Plus for final copy.)

### The Database

The database in *Works* is a simple-to-use, yet moderately powerful electronic filing system. If you have to organize anything in your home or small business, this database should be the ticket.

Records and the fields within them can be constructed quickly and painlessly in *Works*, moved on the screen to create the exact form you want, selectively chosen for in-depth analysis, and printed in several report formats.

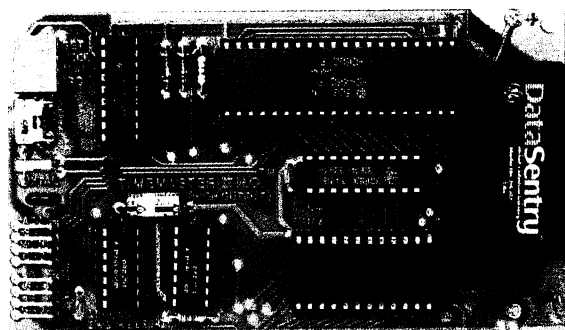
But one of the special attractions of the the database in *Works* is its ability to integrate information with the package's word processor module. Using the two modules, you can create forms, form letters, and mailing labels.

This next demonstration of *Works's* power shows how you can use the database and word processor together. The guidelines outlined here can easily be applied to your own specific form-letter needs.

### The Special Merge—Form Letters

A form letter is simply one that says the same thing to a lot of different people. The letter's text is the same except for the instances where it's personalized for the recipient. The form

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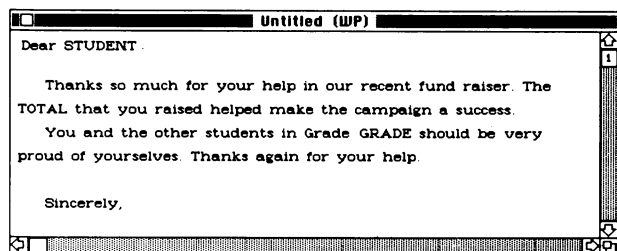
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letter in Figure 4, for instance, is one that could be used to thank all the participants at the end of a school fund-raiser. The words and phrases you see in uppercase should be replaced with personalized information for each participant. Fortunately, with the special word processor-database link called Merge, you can let *Works* do all the work. Once you prepare a merge document, *Works* will print one copy for each record in the related database file, inserting information from each record into the word processor document.

**Figure 4: Form-Letter Skeleton**



*The form letter before the Merge link.*

Open the appropriate data file; then start a new word processor document. When you design a merge document, it's not necessary to keep the database document visible, but it *must* be open.

In the new word processor document, type the form letter as you see it in Figure 4. The keywords (those in all uppercase) aren't necessary, since the information from the database will be inserted wherever you indicate, but it's easier to write the letter using keywords like this.

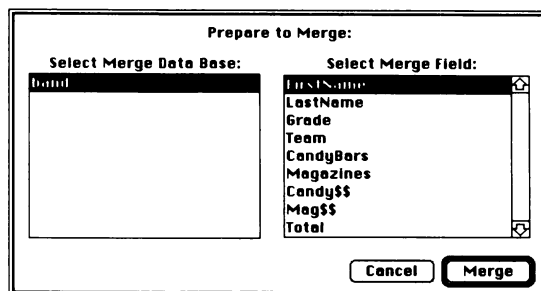
Begin the Merge setup by inserting the student's name. Select the word *STUDENT* in your form letter (just the word, not the colon) and Backspace to erase it. There should be a space between the word *Dear* and the insertion point.

Select **Prepare to Merge** from the Edit menu. The resulting dialog box has two scroll boxes in it. On the left is one containing the name of any open database document—in this case, only the file named *band*. On the right is a list of fields in the selected database.

The first thing you need is the student's *FirstName*, which is already selected in the window. Click on the Merge button and the dialog box disappears. A special box is now in your word processor document. The box contains the name of the database file you selected and the name of the field. This shows that when you print the document, the information in the *FirstName* field of the *Band* document will be inserted at this location.

Type a space after the merge box now on

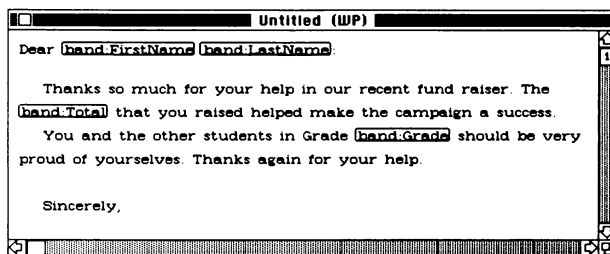
**Figure 5: Merge Dialog**



*The merge-dialog box contains two scroll boxes. The one on the left holds open database documents, while the one on the right lists the fields in the chosen database.*

your screen—the cursor is at its right—and choose **Prepare to Merge** again, this time selecting the *LastName* field. Next, merge the *Total* field in the spot where you earlier typed the keyword *TOTAL*. (When you select *TOTAL* in your word processor document to erase it, make sure you don't erase the trailing space. You'll need a space on either side of the final information, which means there should be a space on either side of the insertion cursor before you merge the field.) Now, insert the *Grade* field at the proper spot. Your document should look like Figure 6.

**Figure 6: The Merge Document**

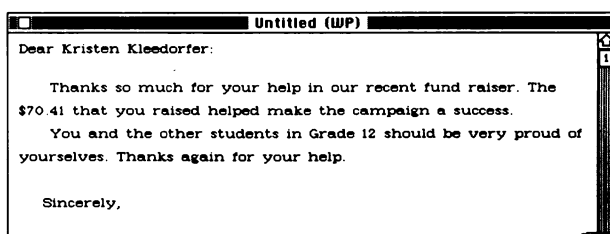


*The completed merge document.*

## A Preview

To see what your first letter will look like when it's printed, choose **Show Field Data** from the Edit menu. This command inserts the data from the first record into the document.

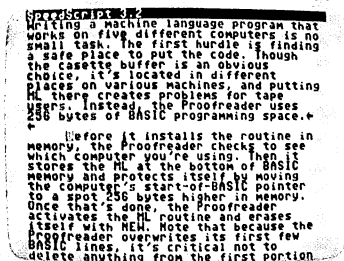
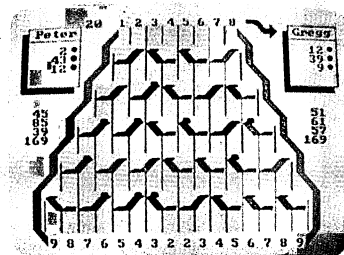
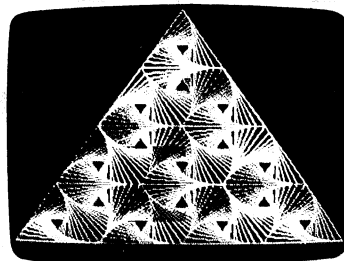
**Figure 7: Previewing**



*With Show Field Data, you can get a preview of the merged letter.*



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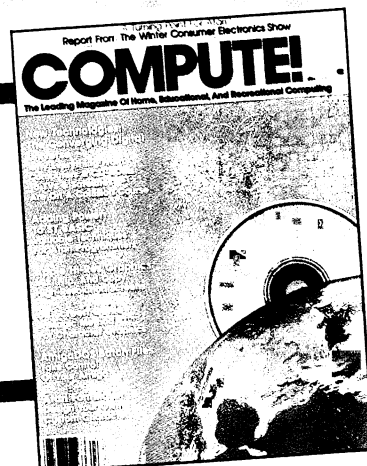
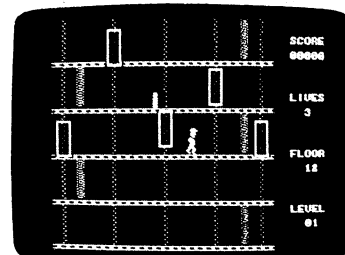
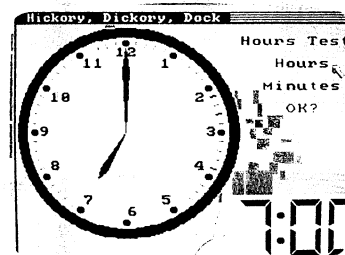
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January	1812.22	582.22	429.99
February	422.22	1842.22	620.00
March	5821.88	4387.22	31.78
April	1356.22	2728.22	1372.00
May	512.22	2424.22	1911.99
June	1922.11	2384.22	1381.11
July	342.45	2888.00	1456.55
August	617.00	1722.00	1105.00
September	1922.00	2258.00	366.00
October	412.44	8888.00	7575.56
November	677.89	3888.00	3210.11
December	2128.00	2888.00	760.00
TOTALS	24448.35	43448.35	26772.56
Average	1422.44	3596.19	2469.85



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If you'd like to display information from any other record, switch to the database window and select the desired record. Switch back to the word processor window, and you'll see the information from your selected record merged into the document. Choose **Show Field Name** to switch back to displaying the merge boxes.

## Graphics

The graphics capabilities of *Works* are bound with the spreadsheet module, and allow you to generate a wide range of charts and graphs to better illustrate almost any kind of data.

Although the charts and graphs can be created complete with legends, labels, and patterns, you can make them even more presentable with a bit of extra work.

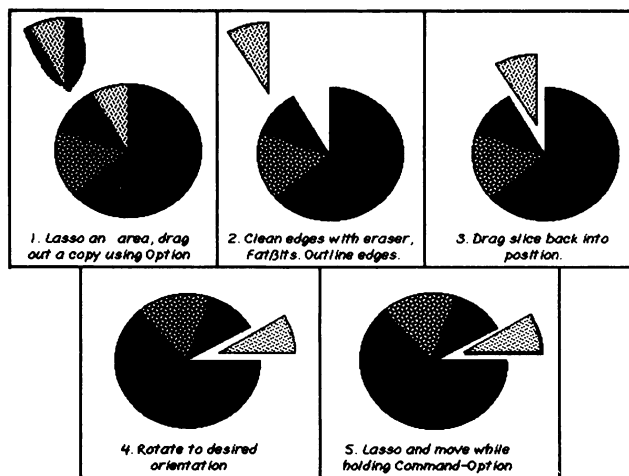
Enhancing charts and graphs takes just a few minutes—time well spent when you're trying to impress.

## Exploding Pie Charts

An *exploded* pie chart is a common variation of the basic pie chart. Some exploded pies have only one slice removed from the circle; others have all the slices separated. Before beginning, make sure you've copied the chart from *Works* to *MacPaint* (or an equivalent Macintosh paint program) through the Clipboard or by using a commercial desk accessory like *Art Grabber* or *QuickPaint*.

To explode your *Works* pie chart using *MacPaint*, first lasso the slice you want to emphasize and drag a copy of it out of the pie. Clean up the edges of the slice in *FatBits*, and outline its edges. Erase the spot in the pie where the slice came from, and drag the clean slice partially back into the empty slot.

Figure 8: The Exploding Pie

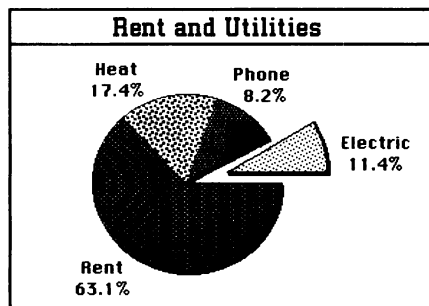


Exploding a *Works* pie chart.

You can rotate the pie to any orientation. If you want to add a shadow, lasso the entire pie and shift it slightly while holding down the Command and Option keys.

Label the pieces with the figures from the legend in the *Works* chart and you're finished.

Figure 9: Looking Good



## Area Charts

A line chart can easily be transformed into an area chart. Use *FatBits* to erase the shapes marking the peaks and valleys in the *Works* chart.

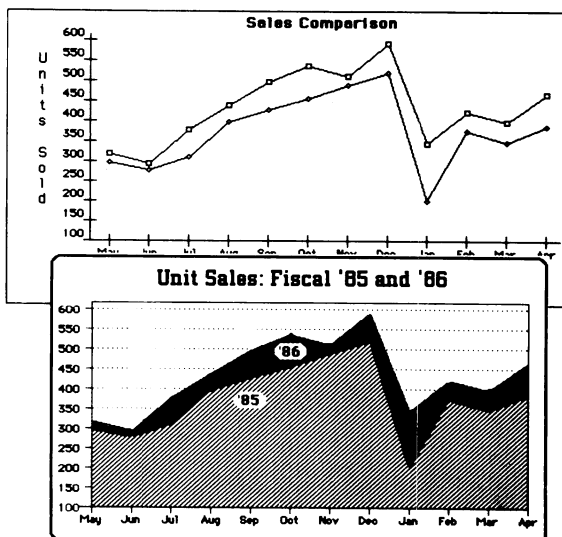
Figure 10: Easy Area Charts



Remove the line junction symbols in *FatBits*.

Close the edges at the beginning and end of the chart so that each line is the top of an enclosed area; then fill each area. Figure 11 shows the original *Works* chart and final area

Figure 11: Area Fill



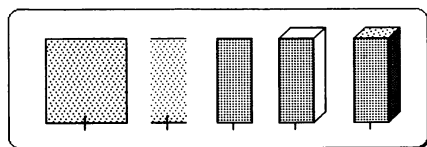
A line chart completely transformed into an area chart.

chart produced in *MacPaint*. The legends were embedded right in the chart, and dotted lines were added to show the grid.

### Three-Dimensional Bar Charts

A simple bar chart can easily be embellished by adding a three-dimensional effect. If the original bars are quite wide, start by erasing their outer edges; then redraw the chart with *MacPaint*'s filled rectangle tool using the top and bottom edges of the graph bar as a guide. By using the filled rectangle tool, you can overlay the original pattern with any other pattern. Add the outer frame to the bar with the line tool—holding down the Shift key keeps the lines and angles straight. Finally, fill the top and side of the column with other patterns.

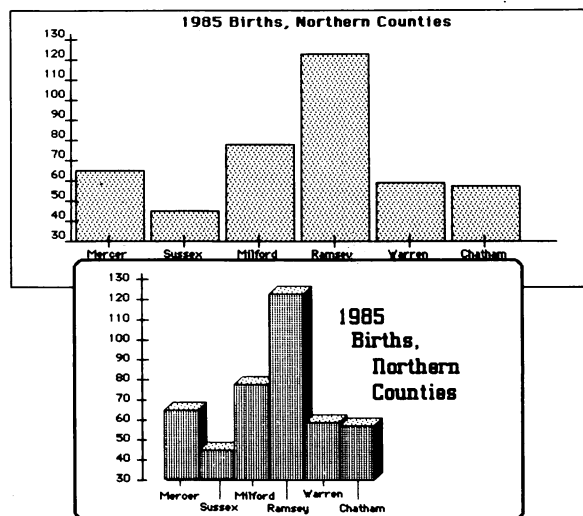
Figure 12: 3-D Bars



*These steps will create a three-dimensional bar.*

You can slide the columns together by lassoing and moving them next to each other, either before or after making them three-dimensional.

Figure 13: Before And After



### The Spreadsheet

Works' spreadsheet can satisfy all but the most power-hungry user. With more than two million cells, 54 functions, and features that simplify data entry, the spreadsheet will appeal to a wide range of people and needs. Your first

worksheet can be created in minutes and can produce complex calculations at the click of a button.

The following instructions take you through a step-by-step construction of a worksheet which duplicates IRS Form 1040. The formulae and comments refer to the form used to report 1985 income, but it can easily be altered to report later years.

*(Note: The Form 1040 template provided here should be used as a tax preparation aid only. If your tax situation is at all complex, think about going to a tax preparer.)*

### The 1040 Form

When you prepare something like a tax form in a spreadsheet, you can take advantage of the adjustable columns and text spillover feature. Take a look at column A in Figure 14, for instance. It holds the titles for each section of the 1040 form as they appear on the real thing, as well as the line numbers of the tax form. (The line numbers don't match up with the row numbers on the spreadsheet because some rows contain titles or dividing lines.) Column B holds most of the form's text, with trailing dots after each sentence so that the next open cell is where the user enters numbers.

The formulae for this spreadsheet are noted in the section-by-section description below. After each formula is entered, protect the cell so that you won't accidentally write over it when you're entering figures.

If you prepare more than one or two 1040's, you'll want to create a much larger sheet which includes other forms and subordinate calculations. If you do, you can just use cell references in the 1040 worksheet instead of filling in, say, your income from dividends. You can even type in the tax tables and use the Lookup function to look up the appropriate tax. (Typing in tax tables doesn't take long—the rows increase mathematically, so you can create a formula and copy it down to complete the table quickly.)

Be sure you create the form *exactly* as illustrated, and use it as described, or the formulae won't work.

### Filing Status, Exemptions Preparation

- Put the form title in D1.
- The double line beginning in A2 is the underline character formatted for underline.
- Line numbers are entered in column A, while text begins in column B. Format all of column A for boldface and right align. For text columns



that should continue over through column H, add as many periods as necessary.

- The single lines beginning in A9 and A17 can be copied from A2 and formatted for normal text.
- Adjust the worksheet's columns as shown so that you can line up the exemption descriptions.
- Formula A adds together the exemptions in lines 6a and 6b. Formula B calculates the total exemptions.

### Formulae

A. =B11+D11+F11+B12+D12+F12

B. =SUM(I12:I15)

### Use

- Type your filing status in cell I8.
- For any exemptions in lines 6a and 6b, type a 1 in the cells pointed to by arrows. Fill in lines 6c–6e as necessary, putting the numbers in column I.

Figure 14: Exemptions

	A	B	C	D	E	F	G	H	I	
1	FORM 1040 U.S. INDIVIDUAL TAX RETURN									
2										
3	<b>FILING STATUS</b>									
4	1	Single								
5	2	Married, filing joint return								
6	3	Married, filing separate return								
7	4	Head of household								
8	5	Qualifying widow(er)								
9									Enter filing status here----->	
10	<b>EXEMPTIONS</b>									
11	6a	== YOURSELF	== 65 or over	== Blind					A	
12	b	== SPOUSE	== 65 or over	== Blind	Subtotal					
13	c	Number of dependent children living with you								B
14	d	Number of dependent children not living with you								
15	e	Number of other dependents								
16	f	TOTAL NUMBER OF EXEMPTIONS								
17										

## Income Preparation

- Continue with line numbers in column A and text beginning in column B.
- End the trailing periods at column H for lines 9b, 17a, and 20a.
- Formula C calculates income from dividends according to information supplied in lines 9a and 9b. Formula D sums the entire Income section.

### Formulae

C. =E21–H21

D. =SUM(I19:I38)

### Use

- Figures for 9b, 17a, 20a, and 21a go in column H. The figure for 9a goes in column E. All others go in column I.

## Adjustments, Adjusted Gross Income Preparation

- Except for line 31, the text spillover should end before column H.

Figure 15: Income

	A	B	C	D	E	F	G	H	I
18	<b>INCOME</b>								
19	7	Wages, salaries, tips							
20	8	Interest income							
21	9a	Dividends							
22	9b	Income from dividends							
23	10	Taxable refunds of state and local income taxes							
24	11	Alimony received							
25	12	Business income or loss							
26	13	Capital gain or loss							
27	14	40% of capital gain distributions not reported on line 13							
28	15	Other gains or losses							
29	16	Fully taxable pensions, IRA distributions, and annuities not on line 17							
30	17a	Other pensions and annuities, including rollovers							
31	17b	Taxable amount of 17a							
32	18	Rents, royalties, partnerships, estates, trusts, etc							
33	19	Farm income or loss							
34	20a	Unemployment compensation							
35	b	Taxable amount of Unemployment compensation							
36	21a	Social Security benefits							
37	b	Taxable amount of Social Security benefits							
38	22	Other income							
39	23	<b>TOTAL INCOME</b>							
40									

- Paste another copy of the long dividing line in cell A50.
- The first page break occurs at the end of this section.
- Formula E sums all the adjustments listed in the column H cells. Formula F calculates the difference between the Income and Adjustments totals.

### Formulae

E. =SUM(H42:H48)

F. =I39–I49

### Use

- Enter the necessary figures in column H.

Figure 16: Adjustments

	A	B	C	D	E	F	G	H	I
41	<b>ADJUSTMENTS TO INCOME</b>								
42	24	Moving Expense							
43	25	Employee business expenses							
44	26	IRA deduction							
45	27	Keogh retirement plan deduction							
46	28	Penalty on early withdrawal of savings							
47	29	Alimony paid							
48	30	Deduction for married couple when both work							
49	31	<b>TOTAL ADJUSTMENTS</b>							
50									
51	32	<b>ADJUSTED GROSS INCOME</b>							

## Tax Computation Preparation

- Enter line numbers, text, and formulae as shown. Make sure the trailing periods end as shown in Figure 17.
- Formula G refers to the cell which holds the adjusted gross income—it's at the bottom of the first page. Just type the equal sign and click in the cell whose contents you want to appear in this cell. Don't copy the formula, or it will be relatively referenced to the wrong cells.
- If you construct a worksheet for Schedule A in a different area of this spreadsheet document, formula H can hold a reference to the final cell of that area.
- Formulae I and J calculate allowed charitable contributions, while formula K deducts the total from the adjusted gross income. Note the IF

function which subtracts either the value in 34a or 34e from the adjusted gross income.

- Formula L calculates total exemptions by referring back to the cell that holds the number of exemptions and multiplying that value by \$1040.

- Formulae M and N calculate taxable income and taxes.

## Formulae

G. =I51

H. [reference to cell of Schedule A worksheet section]

I. =H57+H56

J. =H58/2

K. =IF(I55>0,I54-I55,I54-I59)

L. =1040\*I16

M. =I60-I61

N. =I63+I64

## Use

- Fill in amount of itemized deductions if you don't create a Schedule A elsewhere on the sheet.

- Fill in charitable contributions if you haven't itemized, and the amount of taxes on lines 38 and 39. In a more complete tax spreadsheet, you can build a lookup table to hold the tax tables and refer to it from line 38.

Figure 17: Computing

	A	B	C	D	E	F	G	H	I
53	TAX COMPUTATION								
54	33	Adjusted gross income from line 33							(G)
55	34a	Itemized deductions from Schedule A, line 26							(H)
56	b	Charitable cash contributions for non-itemized							
57	c	Charitable non-cash contributions							
58	d	Total 34b and 35c							(I)
59	e	Half of line 34 d							(J)
60	33	Subtract 34a or 34e, whichever applies, from line 33							(K)
61	36	Multiply \$1,040 by total number of exemptions, line 6f							(L)
62	37	Taxable income							(M)
63	38	Enter Tax							
64	39	Additional Taxes							
65	40	Total taxes							(N)
66									

## Credits

### Preparation

- Enter line numbers and text, adding trailing periods only to the columns as shown in Figure 18.

- Formula O sums lines 42-44, and formula P uses an IF statement so that a number less than zero won't be entered.

- Formula Q adds the business credits, while formula R calculates total credits without allowing the result to be below zero.

## Formulae

O. =SUM(H68:H71)

P. =IF(I65-I72>0,I65-172,0)

Q. =I75+I74

R. =IF(I72-I76>0,I73-I76,0)

## Use

- Fill in figures as necessary in the proper columns.

Figure 18: Extra Credit

	A	B	C	D	E	F	G	H	I
67	CREDITS								
69	42	Credit for the elderly and disabled							
70	43	Residential energy credit							
71	44	Political contributions							
72	45	Total personal credits							(O)
73	46	Subtract line 45 from line 40. Enter result, but not less than 0.							(P)
74	47	Foreign Tax credits							
75	48	General Business credit							
76	49	Total business credits							(Q)
77	50	Subtract line 49 from line 46. Enter result, but not less than 0.							(R)
78									

## Other Taxes, Payments, Refunds Preparation

- Type in line numbers, text, and formulae.
- Formula S sums Other Taxes and Total Tax from previous section. Formula T sums Payments.

- Formula U shows overpayment if payments are higher than taxes, and formula V shows amount owed if the payments are lower.

## Use

- Fill in necessary figures, using correct columns.

## Formulae

S. =SUM(I77:I84)

T. =SUM(H88:H94)

U. =IF(I95>I85,I95-I85,0)

V. =IF(I85>I95,I85-I95,0)

Figure 19: Other Tax Stuff

	A	B	C	D	E	F	G	H	I
79	OTHER TAXES								
80	31	Self-employment tax							
81	32	Alternative minimum tax							
82	33	Tax from recapture of investment credit							
83	34	Social security tax on tip income							
84	35	Tax on an IRA							
85	36	TOTAL TAX							(S)
86									
87	PAYMENTS								
88	37	Federal income tax withheld							
89	38	1985 Estimated payments and amount applied from 1984							
90	39	Earned income credit							
91	40	Amount paid with Form 4858							
92	61	Excess social security tax and RRTA tax withheld							
93	62	Credit for Federal tax on gasoline and special fuels							
94	63	Regulated Investment Company credit							
95	64	TOTAL PAYMENTS							(T)
96									
97	REFUND OR AMOUNT YOU OWE								
98	65	If line 64 is larger than line 36, enter amount OVERPAID							(U)
99	66	Amount of line 65 to be REFUNDED TO YOU							
100	67	Amount of line 65 to be applied to your 1986 estimated tax							
101	68	If line 36 is larger than line 64, enter AMOUNT YOU OWE							(V)

aa

Sharon Zardetto Aker is a Contributing Editor to MacUser, and has written numerous books concerning the Macintosh and its applications. Her next book, MacBits: Utilities and Routines for the BASIC Programmer (COMPUTE! Books) is scheduled for a Fall 1986 release.



# Buyer's Guide

## To Business Software

**T**wo years ago, *Apple* and *business* were words not often said in the same breath. It's different in 1986. Increasingly, businesses of all sizes are looking to Apple personal computers for easy operation and sophisticated applications.

Much of this renewed interest in Apple computers centers on the Macintosh. The Macintosh Plus, with its huge memory and fast execution, is making its way into more and more of America's businesses. Engineers are attracted to the machine because of its high-resolution graphics display, writers look to it for its word processing abilities, and finance and accounting people like it because of the powerful spreadsheets and databases available.

In fact, much of the newer business software is for the Macintosh, as you'll see in this

buyer's guide.

But all the attention paid to the Macintosh doesn't mean the Apple II line isn't attracting business users too. More memory, high-capacity disk drives, and software to match make the Apple IIe, IIC, or IIGS a valued partner in many businesses. More and more Apple II software has a Macintosh look—the easy-to-use interface is making converts.

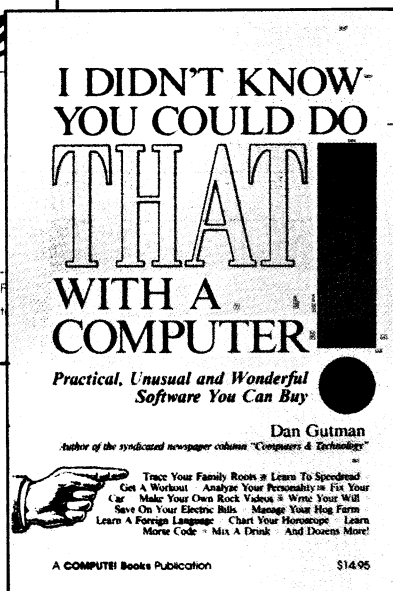
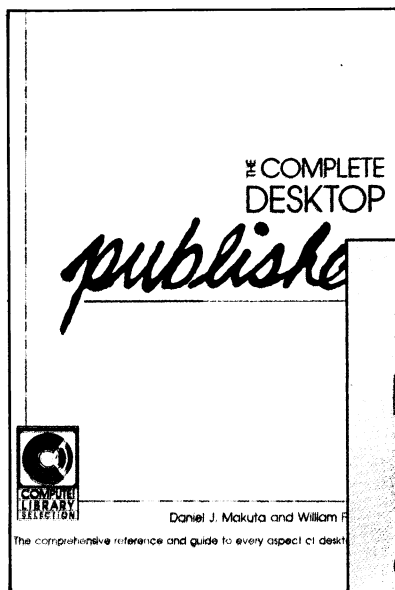
This buyer's guide lists just some of the newer programs available for Apple's personal computers. The majority were released between January and August of 1986. Since no buyer's guide can be exhaustive, what you'll find here is simply a wide-ranging sample of new business software.

Note that prices and machine availability are subject to change.

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Product	Price	ISPN	Publisher/ Vendor	Systems	Description
<b>Word Processing</b>					
Acta	\$59.95	77436-100	Symmetry	Mac, Mac+, MacXL	A simple-to-use outliner which allows you to save your outlines in three formats: Acta only, word processing, or text only.
AppleWorks Modify Plus, Version 1.3	\$59.00	85150-045	Videx	II+	This program creates a new <i>AppleWorks</i> startup disk that allows Apple II+ computers to use <i>AppleWorks</i> .
Bib/Rite	\$45.95	45037-150	Robert E. Litke	II+, IIe, IIC	Designed to prepare reference lists for papers prepared for professional journals, as well as students' term papers and theses.
E/G/Word, Version 2.2	\$379.00	20012-300	Counterpoint	Mac	Japanese word processing allowing full text-entry access to all written components of the language.
Enhance AppleWorks	\$50.00	85237-400	Vilberg Brothers Computing	II, II+, IIC, IIe	Lets you use new character typefaces with <i>AppleWorks</i> . Now you can get italics, Greek, symbols, and many other fonts.
Gutenberg Sr.	\$262.22	33831-300	Gutenberg Software Limited	II+, IIe, IIC	A word processor that includes customized screen formats, special alphabets, scientific symbols, graphic pictures, and more.

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Dan Gutman

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My Office Deluxe	\$249.99	23762-635	Datapak Software	Mac	Program with file management, word processing, form design, mathematical formula capabilities, and more.
Sidekick: The Macintosh Office Manager	\$99.95	8225-087	Borland International	Mac	A super-organizer integrated with nine desk accessories, and a multitasking office manager for the Macintosh.
Smart Alarms and the Appointment Calendar	\$49.95	41387-125	Imagine Software	Mac, Mac+, MacXL	The Smart Alarms desk accessory displays reminders automatically from within any application. The Appointment Calendar offers custom design and automatic layout of calendar pages. Full search capabilities and print functions included.
Stella	\$200.00	35638-800	High-Performance Systems	Mac	Simulation and modeling package used to improve your thinking and learning productivity.
Welcome	\$79.95	366-500	Abracadata	II, II+, IIe, IIc	Enables the key person(s) in your organization to provide new and current members with information for use and reference.

## Graphics

Banner Builder	\$29.95	61687-150	Power Up	II, II+, IIe, IIc	A simple, economical way to create dramatic banners with any printer.
Colormate, Version 2.2	\$95.00	72235-014	Softstyle	Mac, Mac+, MacXL	The first coloring and color-printing software for the Macintosh, the ImageWriter II, and the NEC Color Pinwriter.
Contract Office Planning	\$499.95	14587-150	Complan Software System	Mac	A symbols library compatible with <i>MacDraw</i> or <i>MacDraft</i> .
Dunn Color Macintosh System	\$14,599.00	26843-300	Dunn Instruments	Mac	A complete system—hardware and software—to produce color film output from your Macintosh.
Font Mechanic	\$29.95	7162-275	Beagle Brothers	II, II+, IIe, IIc	A companion to <i>Shape Mechanic</i> disk. It gives you 30+ new fonts to use in your programs, plus a new set of utilities.
Iconix	\$29.95	71675-400	So What Software	II, II+, IIe, IIc	Hi-res graphics, text, and animation editor.
Mac-Art Library	\$200.00	15178-470	CompuCraft	Mac, Mac+	Collection of 11 disks full of <i>MacPaint</i> images illustrating a wide variety of subjects.
MacAtlas	\$199.00	50675-475	Micro: Maps	Mac	<i>MacPaint</i> and <i>MacDraw</i> maps of the USA, seven continents, and all 50 states, county by county.
MacBillboard	\$35.00	11725-205	CE Software	Mac, Mac+, MacXL	Can be used in a multitude of ways at home and at the office. Draw original pictures or modify any artwork created with <i>MacPaint</i> .
MacMovies	\$99.00	07225-500	Beck-Tech	Mac, Mac+	A powerful set of animation tools. An image processor that goes beyond slide-show-type programs.
MacPalette	\$77.28	53431-498	Microspot	Mac	Enables you to print multicolored pictures and text from existing Macintosh software using the ImageWriter II printer.
Minipix Disk #1	\$29.95	7162-345	Beagle Brothers	II, II+, IIe, IIc	Two hundred on-disk hi-res mini pictures. <i>Mouseprintz</i> lets <i>Mouseprint</i> users print their pictures directly to an Epson or other non-Apple dot-matrix printer.
MockChart	\$30.00	11725-225	CE Software	Mac, Mac+, MacXL	Create line charts, bar charts, pie charts, and hi/lo-close charts without ever leaving your word processor.
Printworks for the Mac	\$75.00	72235-085	Softstyle	Mac, Mac+, MacXL	A color printer utility program that supports 20 popular non-Apple printers, as well as the ImageWriter I and II.
Shape Mechanic	\$39.95	7162-360	Beagle Brothers	II, II+, IIe, IIc	A lightning-fast remake of <i>Apple Mechanic</i> and <i>Typefaces</i> disks, which have been combined and rewritten to support ProDOS as well as DOS 3.3.
Sign Designer	\$59.95	61687-710	Power Up	IIe, IIc	Lets you create artist-quality signs on your own printer, without the delay and expense of using a sign shop.

## Communications

EtherMac	\$75.00	43-250	3Com	Mac, Mac+	The Macintosh user can gain access to a high-performance network server and network-based data sharing with IBM PCs and compatibles.
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Product	Price	ISBN	Publisher/ Vendor	Systems	Description
Express Mail	\$280.00	82310-300	Topexpress Limited	Mac	An electronic-mail store-and-forward system designed to be used with the Macintosh office.
Mac + II	\$149.95	48553-400	Meacom	Mac, Mac+	An Apple II+ or enhanced IIe emulator (128K, 80-column) that runs Applesoft, Integer BASIC, 6502 and 65C02 machine language, and more.
Mailbox	\$450.00	79646-300	Tangent Tech.	Mac	Allows the users of IBM PC and compatible computers to send information to a Macintosh via AppleTalk Personal Network.
MicroPhone	\$74.95	73963-550	Software Ventures	Mac	A telecommunications program that automates the telecommunications process and lets you record complete telecommunication sessions for later use.
Portfolio	\$750.00	28068-700	EduDisc	Mac	Picture-archiving software to record, catalog, and retrieve still images on videodisk.
Procom-M Version 1.75	\$49.00	63273-405	Prometheus Products	Mac	Telecommunications software for Macintosh with Xmodem, MacBinary, Text Editor, log-on macros, and phone directory with log.
Turbodownload	\$39.95	46041-740	Mainstay	Mac, MacXL	A download speed-enhancement utility that saves time. Written completely in assembly language.
II in a Mac	\$69.00	51562-150	Micro-W Dist.	Mac	Run Apple II programs on your Macintosh. Supports hi-res, lo-res graphics, and all text modes.
Underground Courier	\$39.95	45909-700	Mac Underground	Mac	Telecommunications software giving you 12 months of unlimited entrance to an underground safehouse and free member classifieds.
Video Bridge	\$399.00	72468-800	Software-Bridge	Mac	Designed to record and report information about current and potential customers and club members in a video rental store.

### Utilities and Accessories

CLR Mathstatlib/Toollib	\$50.00	12891-320	Clear Lake Research	Mac	Both programs <i>Mathstatlib</i> and <i>Toollib</i> contained on one disk. Machine language routines that can be called from BASIC programs.
Disk-It	\$50.00	66450-174	Right On Programs	II+, IIe, IIc	Categorize and catalog all software.
Echo+ Speech Synthesizer	\$149.95	76559-300	Street Electronics	II, II+, IIe	Contains circuit board, eight-Ohm speaker, disk with demonstration and utility programs, and tutorial-style manual. Hardware/software.
Flashback	\$59.95	46041-300	Mainstay	Mac, Mac+	Backs up HFS hard drives in a flash. Be selective and back up any category of files that you want.
GBBS Pro	\$125.00	50125-300	Micro Data Products	II+, IIe, IIc	Features multiple bulletin boards, password protection, private electronic mail, and XMODEM up-/downloads.
Hard Disk Backup	\$54.95	31697-390	FWB Software	Mac, Mac+, MacXL	Back up a hard disk to floppy disks.
Hard Disk Util	\$89.95	31697-400	FWB Software	Mac, Mac+, MacXL	Upload copyprotected software to a hard disk and avoid the "master key disk" syndrome. Compatible with almost all hard disks.
Locksmith 6.0	\$79.95	2346-700	Alpha Logic Business Systems	IIe, IIc	Allows the Apple user to recover crashed disks, restore accidentally deleted files, and more.
Macroworks	\$34.95	7162-340	Beagle Brothers	IIe, IIc	Will convert any series of keystrokes into a new one-keystroke <i>AppleWorks</i> command or macro.
Masscopier	\$20.00	11725-210	CE Software	Mac, MacXL	Turn your Macintosh into an affordable, effective bulk-disk duplicator.
Mydisklabeler, Version 2.11	\$44.95	86506-475	Williams and Macias	Mac, Mac+, MacXL	Makes distinctive 3.5-inch disk labels for the Macintosh.
Packer	\$29.00	8075-700	Bobbing Software	Mac, Mac+, MacXL	A simple utility that compresses files. It can be used to save disk space and also protect files.
Stripper	\$19.95	11571-800	Cauzin Systems	II, II+, IIe, IIc, Mac	A data strip program. It lets you strip your disk files onto paper.
Touch Window	\$199.95	77038-909	Sunburst	II+, IIe, IIc	Attaches easily to your monitor or TV screen to convert your computer into a touch screen.
Typewriter	\$39.95	61687-890	Power Up	IIe, IIc	Turns your computer and printer into a full-featured typewriter—still an essential tool in any office.

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# Inventing The Future

## New Directions For Computers In Education

Fred D'Ignazio, Associate Editor

*Telecommunications. Robots. Problem solving. Videodiscs. Equal and open access to technology. These are issues on the frontiers of educational computing. Associate Editor Fred D'Ignazio recently visited with some of the pioneers who are researching, experimenting with, and inventing the future of computers in education. No one here is a crystal-ball gazer, comfortable with armchair predictions. Like Seymour Papert, the creator of Logo, they all believe that "the future of educational computing is a matter for intervention, not prediction."*

### Personal Knowledge Tools

Our image of computers in education has changed drastically, says Karen Hoelscher, Associate Editor for *Computers in the Schools* magazine. In the early days of educational computing, we saw computers as electronic textbooks. Children just pressed the Return key and read words on the screen. Later we became aware of computers' branching ability and created lessons that were altered by the choices made by each learner. Yet the lessons still consisted mostly of screen after screen of text.

Next came what Hoelscher calls "the quasi-interactive" programs like *Lemonade Stand* which created a problem (such as how to manage your own lemonade stand) and then challenged a student to make the decisions needed to solve it. Unfortunately, many of these programs created artificial situations that weren't meaningful to the child using them. And much of the problem solving was masked from the user and done by the computer.

"There's a *Peanuts* quote from Charles Schultz I like," says

Hoelscher. "One of the *Peanuts* kids says, 'There's no heavier burden than having a great potential.' The focus has been on computer potential, not human potential. But human potential has always depended on how well we use the tools we have."

**T**his is the direction taken by the newest programs in educational computing. "The newest programs," Hoelscher says, "are like scaffolding for helping us think rather than having the computer do the thinking for us. They help us reach our potential as problem solvers and don't expect the intricacies of software to do it all for us."

One such program—or group of programs—is the MECC (Minnesota Educational Computing Corporation) *Computing and Information* collection. Hoelscher worked with MECC to develop 12 programs designed to assist in

improving skills in several areas: typing, word processing, graphing, database management; and general productivity, information analysis, and problem solving.

"The *Computing and Information* series," explains Hoelscher, "encourages children to use the computer to explore problems on their own. It lets them look at problems in new ways; it lets them try their own method five times in a row and still never judges them harshly. It gives a learner time to come to see a problem in a new way; time to solve a problem their own way."

Hoelscher speaks of the "human-tool partnership" and calls the current generation of programs a "new problem-solving environment."

"What is most important about these tools," says Hoelscher, "is that they promote activities where kids are working on problems relevant to themselves. They are *personal knowledge tools*. Instead of requiring a lot from the program, they require more from each person. And when a person gives more, he gets more back. This time, it's the humans who benefit directly from their partnership with the computer."

## Transformational Environments

Anne Porter Jaworski is a professor of Early Childhood Development at Oakland University in Oakland, Michigan. Jaworski is also an educational entrepreneur. She has founded two preschools and kindergartens which help her keep her thinking and writing anchored in problems and concerns of real-world teachers and children.

Jaworski is convinced that just adding more computers and more software will not help schools prepare young people for life in the twenty-first century. It's not *whether* students can use computers, but *how* they use computers that will affect their success in future careers.

To this end, Jaworski and her colleague, Craig Stirton, have devised a new curriculum for incor-

porating technology into the classroom. They call this curriculum a *transformational environment*. Its purpose is to give learners a high level of competence with computers and other tools and enable them to use those tools for meaningful, personally defined objectives.

"I'd like to do everything I can to remind teachers that learning can be an exhilarating experience," says Jaworski. "There is something about coming to terms with a problem that is meaningful to you. Solving it is so sweet. I want to bring this experience to children and make it habit-forming."

"I'd like to create environments in the classroom where people believe they're just having fun, then, looking back, they are surprised at how much they've learned and how much they've changed," she adds.

**B**ut there are often problems when teachers are asked to deal with technology. "Teachers and children are under pressure now to demonstrate competency and boost their test scores. But the solution is not just to add more technology," she adds. "Teachers are forced to devote themselves blindly to the curriculum. They are forced to act like robots. As a result they administer the curriculum mechanically. They use technology mechanically. And, as a result, all they get from the kids is 'throughput'—output which is unmodified input."

"Meanwhile children learn not to 'digest' what teachers feed them; they learn that their test scores and grades are higher if they don't modify information and make it their own. They put up shields to protect themselves from attack. With your shields up nothing can affect you. Shields and throughput are part of the hidden curriculum in the classroom."

"They are also the obstacle that prevents any real learning from taking place," continues Jaworski. "Until now, technology

has just been another demand on teachers that has made them erect their own shields and behave like robots. But it doesn't have to be this way. Teachers can use computers and other devices to help make what they do more fun and more efficient. Software already exists in each subject to make this happen."

"Contrary to popular misconceptions, technology can humanize education. A teacher can use machines to establish a personal relationship with her children. She can develop a mutual trust in which she says, 'I care about you; I care about your private, inner self.' When the trust is real, the shields come down—on both sides. And for the first time, learning is possible," Jaworski says.

## Teacher Shock And The Two Curricula

If teachers are to integrate computers into the classroom, they'll need much more support than they're now getting. And they'll need it primarily from their own school administrators. So says Karen Hoelscher.

"There are really two curricula related to computers that schools are trying to address," Hoelscher explains. "First, they must plan for the new curricula created by computers. This includes courses on computer literacy, computer ethics, computers in society, computers and business, and so on. Second, they must integrate computers into the ongoing school curriculum."

Hoelscher says that schools which are most successful in integrating computers have introduced computers gradually and have a "dedicated policy of adding more computers each year and of matching computer activities with objectives the school already has."

"Administrators need to demonstrate to teachers that they can use the computer as a tool in their own curriculum realm. Perhaps the computer can help the teacher be more efficient or teach a unit more quickly. Perhaps it can help motivate a teacher and her students by making a unit more fun."



It's up to administrators to provide a non-threatening environment in which teachers can learn about them [computers], become comfortable with them, and use them with their students."

## Explore-A-Story With Computers

Many schools now use computers to supplement books and other learning materials and help students learn the basics.

One program in which computers are directly supporting books and reading is *Explore-a-Story* from textbook publisher D.C. Heath. There are eight *Explore-a-Story* packages, targeted at grades K-4. For \$66 a teacher gets a disk, a Teacher's Manual, and five storybooks. Students can read the text story, then read the same story on the computer screen.

But this is just the beginning. The story—both the pictures and the text—is completely interactive. A child can redesign each illustration and add new words, pick up the story where the author left off, retell the story, or go off in a completely new direction. Text can be added anywhere, then cut, pasted, erased, or copied anywhere else. Children can pull down a menu of characters and objects and select dozens of copies and place them in the illustration. When each character is set down, it becomes animated—rabbits and frogs hop, fish swim, lima beans come to life and sprout legs and arms.

*Explore-a-Story* lets children use their imagination to personalize the stories. If the school's computer has a printer, children can print their new stories (illustrations and text), then bind the pages with staples or tape to make their own book.

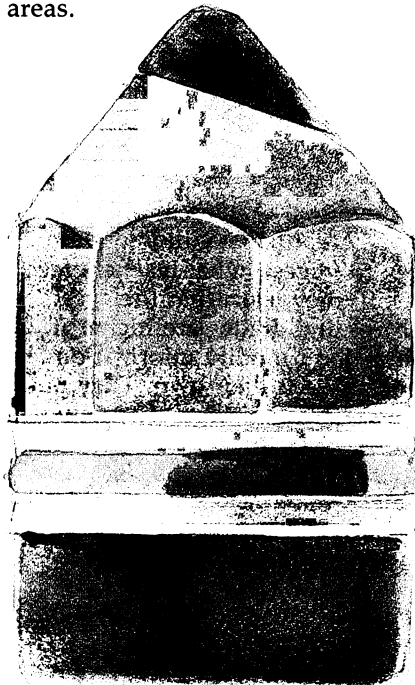
One of *Explore-a-Story*'s designers, Henry Olds of Learningways, says that the interactive stories increase children's language-arts skills, but the interaction also accomplishes something even more significant. "The greatest danger in our educational system," says Olds, "is the belief that there is only one way of learning. This is much worse than

believing that there is only one right answer. It is a belief that there is only one way of looking at something; one way of thinking about something.

"Computer programs like *Explore-a-Story* help children and teachers see that learning can proceed along many different paths. Once they recognize this as a valid way to learn, they can try to bring the paths closer to the child's ideal personal path."

## The Computer As Pencil

Computer language pioneer and scholar Seymour Papert, in his book *Mindstorms*, writes about something he calls the "computer culture." The computer culture is created from a teacher's beliefs about children, computers, and learning. The beliefs create an atmosphere in the classroom that's a prerequisite for introducing computers successfully. Papert had hoped that his computer language, Logo, would help teachers create this culture. Unfortunately, many Logo teachers have concentrated on the language itself and not on the values underlying it. As a result, Logo is frequently taught the same way as any other programming language. In addition, researchers have reported that Logo doesn't, on its own, improve children's thinking, and that Logo skills don't translate into skills in other curriculum areas.



One reason the computer culture hasn't been implemented, says Papert, is that most kids spend very little time around computers. Student-computer ratios in most schools are so low that children only get to spend one-half hour or one hour per week on a computer. According to Papert, "Studying computers under primitive conditions is a zero basis for research."

Anticipating a time when children will have more access to computers, Papert has begun an intensive project at the Hennigin Elementary School in Boston, near the MIT campus where Papert teaches. According to Papert's colleague, Brian Harvey, "At Hennigin, there is one computer for every two kids versus 'My time on the computer is on Wednesdays from 2:30 to 3:00 p.m.'"

"The Hennigin Project," says Harvey, "is not to prove that computers improve education. It is to find out what happens in a computer-rich culture. Since we have been there we have already shown that when there are so many computers around all the time, children no longer regard them as something snazzy and special; they take them for granted."

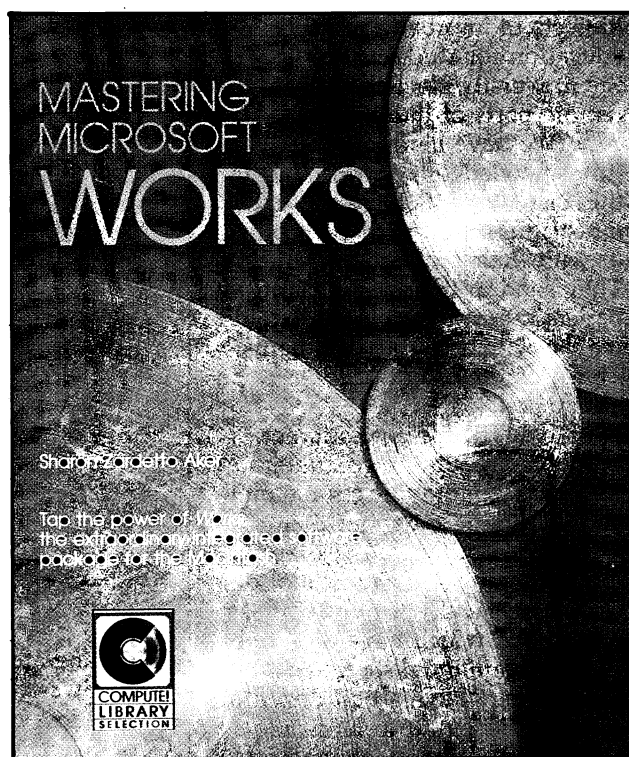
Papert agrees. "I want children to see the computer as an ordinary part of their environment—just like a pencil."

When asked if he worried that the Hennigin experience might be "overkill" and actually make kids numb to computers, Papert replies: "Are kids numb to dinosaurs?"

"Too many computers will not make them non-special to children," Papert continues. "Instead it makes them transparent. For the first time, kids won't focus on the computer itself, they'll focus on their own goals. For example, at Hennigin if you ask kids what are you doing, they don't say, 'I'm doing Logo,' or 'I'm working on the computer.' Instead they say, 'I'm doing a skeleton project,' or 'I'm writing a report.'"

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The excitement is still there, but it is focused on tasks beyond the computer—tasks defined by the students themselves."

### Classrooms Without Walls

At Simon Fraser University in Vancouver, British Columbia, Sandy Dawson and David Bell are working on several computer projects to improve the quality of education for students who attend the university electronically from remote parts of the province.

"We have instructional TV (the Knowledge Network), but in the past, students have not had much interaction with each other or with their professors or tutors. They send in their papers, and the papers return to them graded and maybe with a couple comments. That was the extent of the interaction.

"Now things are different. Students are joining computer networks, sending electronic mail, and sharing ideas about their courses. Also, the courses tap different members of the School of Education faculty. Unlike courses on campus which have only one professor, online *distance-ed* courses may have a half dozen or more. We even tap professors from other departments and other universities. What's more, online courses are much more informal and freewheeling. Students have long passionate dialogs with their teachers. And they don't let them get away with any sloppiness or procrastination. If a professor doesn't answer their mail or grade a paper, the student is back on the system in an instant asking why. The richness of the faculty for long-distance courses, the exciting interaction between students and between students and teachers, and the informal atmosphere have all made distance-ed courses the most popular courses at Simon Fraser."

### Kids To Kids

Gerri Sinclair, professor at Simon Fraser University and colleague to Bell and Dawson, coordinates a project entitled "Kids to Kids" with the European organization RAPPI. Children from 40 schools in Canada, England, Italy, and

France run the Kids to Kids network. Schools apply to join the network and are given an account. The network began as a teacher-run teleconference and, according to Sinclair, was "stuffy and dreadfully boring." Apparently, things really became exciting when the teachers turned the conference over to the children. Sinclair feels this is one of the first examples of



"kid-generated curriculum." And it's impressive. Daily teleconferences include a Geography Conference, a Science Fair Conference, a Collaborative Story authored by children across several continents, and impassioned discussions about the environment and other issues.

"With telecommunications," says Sinclair, "teachers and children can move beyond a classroom with four walls and a chalkboard. Your classmates can be living anywhere in the world and speaking a different language.

"Logo helped me see anyone in the classroom as a resource for learning," she continues.

"Buckminster Fuller's old dream of a 'global classroom' can now become a reality. Classrooms can network with each other long-distance via modems. It is cheap, affordable, and very empowering—both for children and teachers."

### Bringing The World Into The Classroom

Karen Hoelscher is working on the "Science Videodisc Project" as

a consultant to the Educational Technology Center (ETC) at Harvard University and the WGBH Educational Foundation. The project involves taking segments of popular NOVA and 3-2-1 *Contact* TV programs and building them into interactive lessons on the computer.

The theme of the project—Scientific Models of Inquiry—is a way of using video to bring the natural world into the classroom. Kids get involved because they watch the way a scientist learns—they see the actual process of "making" science. One program, for instance, focuses on the famous scientist Linus Pauling. As part of the program, kids watch what Pauling does, then decide how they would do certain experiments themselves.

"This experience," says Hoelscher, "contrasts sharply with the way science is being taught in many junior high classrooms. The classrooms we visited as part of the project were very uniform. Science was taught as a body of facts rather than a process of analysis and discovery. Most science teaching was conducted as an abstract verbal discussion rather than a laboratory of experimenting, thinking, and hands-on interaction with real materials."

### Computing And The Community

Boston Museum of Science's Inabeth Miller is also working with interactive videodisks. "The future of educational videodiscs lies in museums where one person interacts with them at a time," Miller says. The Boston Museum of Science already has two educational videodisc projects on the drawing board. One is to set up a reference encyclopedia. Another is to create a simulation as part of the museum's water exhibit. "You become the mayor of a small town," she says. "You have to make important decisions regarding the town's energy and water resources."

Since coming to the Boston Museum of Science a year ago, Miller has begun a number of computer-related projects asso-

ciated with the museum. In addition she has set up a section of the museum called "The Computer Place" with a hundred computers, 150 different learning activities, and a thousand pieces of software. Her goal is give people in the Boston community access to computers and get them excited about learning. "I don't care what they learn," she says. "I just want to show them that they have the capacity to learn no matter how old they are and regardless of their mental or physical disabilities."

Some of the museum's current projects:

- **Mask Making.** Children use computers to make masks, then parade around the museum with the masks on.
- **The Other Side.** Children in the Boston Museum of Science recently played Tom Snyder's computer strategy game *The Other Side* with children in Geneva, Switzerland.
- **Marathons of the Mind.** Local Boston colleges and high schools have sent teams to the Science Museum to battle each other using adventure games from InfoCom. The battles begin at 5:00 on Friday afternoon and have raged the entire weekend. In one recent battle a team of women students from Wellesley College defeated two teams from MIT.
- **Explore-a-Story.** Learningways is developing eight science *Explore-a-Stories* for the Computer Place. To coincide with the museum's fall dinosaur exhibit, the company is creating *Dinosaur Construction Kit* that lets you go on an archaeological dig and build an entire dinosaur from scratch—including the skin.
- **Partners in Learning.** This program is for parents and their preschoolers.
- **Telecommunications for Teachers.** This course introduces teachers to modems, bulletin boards, and online networks. It lets them sign on and use online databases, and discuss ways to integrate telecommunications into their curriculum.
- **Robotics.** In February, 1987, the museum will host the largest robotics exhibit in the country. In

## The Turtle Ballet



Gerri Sinclair is a professor at Simon Fraser University and one of the most compelling exponents of computer telecommunications in education. However, her interests also extend to another hot area in computers and education—robotics. To Sinclair, robotics represent a means for students to take computers out of the abstract, two-dimensional world of the picture screen into the three-dimensional real world.

Seymour Papert's approach to

this problem has been to create a project which integrates Logo screen turtles with Lego building blocks. In a basement classroom at MIT, Papert and his associates Mitch Resnick and Steven Ocko have set up a Lego-Logo wonderland where children build Lego structures of every shape and description and animate them using tiny motors. Then they program and control them using a new, advanced form of Logo.

At the other end of the continent, Sinclair, David Bell, and Sandy Dawson have also been busy bringing turtles into the real world. They amassed a collection of real-world robots in a local classroom in downtown Vancouver, including Valiant turtles, BBC buggies, verbots, and dingbots. They programmed them, and got them to roll, walk, and weave around the room. When Sinclair saw the robots moving together, they reminded her of dancers in a ballet. She and her associates found a film producer—the result was a strange yet ingenious creation, a videotape entitled "The Turtle Ballet." In the video, robots dance, dart, and swoop around a darkened stage to the music of Strauss, Tchaikovsky, and Ravel.

the meantime, Computer Place runs workshops on robotics for kids and adults. In a recent workshop, students created a robot "habitat" in one of the museum's empty classrooms and programmed a robotic Julia Child to bake a cake in the classroom's imaginary oven.

For Miller, these projects are just the beginning.

"This is the ideal time for the museum to play a major part in people's learning. Parents trust us. Schools trust us. And they are willing for us to let people learn through play. We have the freedom to innovate and try new things because we are not being evaluated, and we are not caught up in a bureaucracy that resists change.

"Our museum director says that science is the culture of our

time. And this is where people can get a drop-in education in science. Our exhibits are set up to give a three-minute learning experience. There is no pressure to learn here—no grades, punishments, or judgments if you're right or wrong," says Miller.

"We just want to give people a chance to learn. Also a chance to discover that learning is the biggest high—better than drugs, alcohol, or anything. And everybody can do it—young people, old people, handicapped people, everyone." **aa**

*Fred D'Ignazio is an Associate Editor for COMPUTE! magazine, a regular commentator on PBS's Educational Computing, and author of numerous books, including COMPUTE!'s Computing Together (COMPUTE! Publications).*



# EDUCATIONAL

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## Software Buyer's Guide

**A**pple's grip on the educational market shows no sign of loosening. Add the recent introduction of the new Apple IIGS, with its sophisticated graphics and sound capabilities, and it's evident Apple could well become *the* name in educational computing.

Nothing demonstrates this more than the continued flood of interesting and unique educational software for the Apple line of computers. Software developers are creating programs that do everything from putting a seismic laboratory in the classroom to teaching

penmanship by allowing a student to trace letters on a touch-sensitive screen. Drill and practice programs, learning tools disguised as games, and problem-solving software are just some of what's appearing on the shelves.

The programs listed here are just some of those released since the beginning of 1986. The buyer's guide isn't exhaustive, but it does give you a sample of what's available.

Note that prices and machine availability can change.

The data for this guide was supplied by MENU—The International Database Corporation. For further evaluative information and ordering, or to insure that your product is included in the database, contact MENU, 1520 South College Avenue, Fort Collins, Colorado 80524. The toll-free numbers are 1-800-THE-MENU, and 1-800-MAC-MENU, or 303-482-5000 outside the United States. When ordering, note the International Standard Program Number (ISPN).

Product	Price	ISPN	Publisher/ Vendor	Systems	Description
<b>Language Arts</b>					
Ace Reporter	\$39.99	54326-180	Mindplay	II, II+, IIe, IIc	Become an ace reporter. Uncover who, what, when, where, and why before the paper goes to press. For grades 2-6.
Alphabet Read Along	\$24.95	7525-016	Bertamax	II, II+, IIe	Reading programs that talk using a pleasant, clear, female voice. Each word is underlined as it is spoken. For ages 4-7.
Be a Writer!	\$40.00	77038-057	Sunburst	II+, IIe, IIc	Can be used either to carry beginners beyond the <i>I Can Write!</i> initial approach to word processing or as a starting place.
Capitalization	\$49.95	47479-190	Marshware	II+, IIe, IIc	Help your students master the rules of capitalization. For grades 2-5.

Product	Price	ISBN	Publisher/ Vendor	Systems	Description
Children's Storydisk Sets—Grades 5–6	\$49.95	33575-040	Grolier Electronic Publishing	II+, IIe, IIc	Students can enjoy games that cast them into roles like that of tour guide, astronaut, and fantasy adventurer.
Compound Words and Contractions	\$49.95	34562-162	Hartley Courseware	II+, IIe, IIc	Cheerleaders "root" for correct answers as students learn to select the words that form compounds and contractions.
Eisenberg Vocabulary Workshop: Spanish	\$51.00	76250-180	Sterling Swift Publishing	II+, IIe, IIc	Designed to provide students with a fun and effective way to practice foreign language vocabulary.
Fun from A to Z	\$49.00	54725-070	MECC	II, II+, IIe, IIc	Preschool- to kindergarten-aged children will be enchanted by these colorful alphabet programs.
Ghost Writer	\$89.00	54725-597	MECC	IIe, IIc	A utility program designed to help young authors critique their own word processed compositions for possible content problems.
Grammar Gremlins	\$49.95	24070-060	Davidson & Assoc.	II+, IIe, IIc	Presents grammar rules with over 700 practice examples and sentences. Covers abbreviations, subject/verb agreement, capitalization, contractions, and more.
I Can Write!	\$40.00	77038-418	Sunburst	II+, IIe, IIc	Consists of 25 lessons which range from open-ended explorations of personal identity to more formal language objectives. For grade 2.
Kapitalization	\$29.95	70675-310	SourceView	II	An educational package that teaches 31 capitalization rules.
Mindstorm: A Computer Workbook, Version 1.0	\$75.00	65262-550	Raymond Clines/Ellen Barker	IIe	Contains a series of imaginative exercises to remediate major grammatical errors and punctuation mistakes made by beginning writers.
M-ss-ng L-nks: Young People's Literature—Economy	\$44.95	77038-497	Sunburst	II+, IIe, IIc	A language puzzle that improves students' reading, writing, spelling, and grammar skills. For grades 3 and up (to adult level).
Muppet Word Book	\$59.00	77038-578	Sunburst	IIe, IIc	An introduction to letters, words, and writing. For preschool–grade 1.
Newberry Adventure—A Wrinkle in Time	\$59.00	77038-590	Sunburst	II+, IIe, IIc	Students live the literary adventure on the computer. For grades 4–8.
Peter Rabbit Reading	\$39.95	30848-750	Fisher-Price	II, II+, IIe, IIc	Based on the tales of Beatrix Potter, this is a richly animated adventure into the world of reading. For ages 3–6.
Print Shop	\$44.95	32819-639	Gessler	II+, IIe, IIc	Write, design, and print as though you owned your own personal print shop. Create French invitations, German signs, Italian stationery, and Latin banners.
Prokofiev's <i>Peter and the Wolf</i> Music	\$39.95	30848-760	Fisher-Price	II, II+, IIe, IIc	Based on the classic tale by Sergei Prokofiev. A delightful introduction to music principles. For ages 3–6.
Punctuation Put-On: Jr. High	\$69.00	77038-717	Sunburst	II+, IIe, IIc	Students are placed in the position of a writer making judgments about how punctuation marks enhance dialogue, narrative, and poetry.
Recognizing Full Sentences	\$18.00	66450-584	Right On Programs	II+, IIe, IIc	The tutorial part of the program, written in very simple language, explains what a sentence is and gives examples.
Shakespeare	\$39.95	34562-766	Hartley Courseware	II+, IIe, IIc	This challenging program includes ten of Shakespeare's greatest plays. Motivator for classroom research and discussion.
Show Time	\$59.00	54725-805	MECC	II+, IIe, IIc	Allows students to become playwrights, picking their own cast of characters and choosing from more than 1000 possible combinations.
Smart Eyes	\$59.95	900-695	Addison-Wesley Publishing	Mac	A speed reading tutor.
SmoothTalker	\$99.95	30836-500	First Byte	Mac	This program converts English text or numbers from the keyboard, <i>MacWrite</i> , <i>Microsoft Word</i> , <i>Jazz</i> , or almost any text document into speech.
Snooper Troops	\$39.95	32819-501 (begin.); -502 (inter.); -500 (adv.)	Gessler	II+, IIe, IIc	A teaching game that helps children develop their French language skills while hunting the villain who fled with Lily the Dolphin.
Speller Bee	\$79.95	30836-600	First Byte	Mac	A talking program that uses a child's own spelling lists in practice spelling routines, word games, and a simulated school test situation.
Spelling Partner	\$34.95	50950-495	Micro Power & Light	II+, IIe, IIc	A spelling program that meets the needs of average and above-average students as well as those with learning problems.
Stickybear Spellgrabber	\$39.95	85825-925	Weekly Reader Family Software	II, II+, IIe, IIc	A spelling and word fun program that teaches kids ages 6–9 to spell correctly and build vocabularies with the help of Stickybear.
Success with Reading	\$124.95	68075-615	Scholastic	Apple II series	A series of reading programs based on the "cloze" reading principle that helps build proficiency in reading comprehension.
Touch 'N' Write	\$69.00	77038-907	Sunburst	II+, IIe, IIc	Your computer can be an effective teaching tool to supplement your school's penmanship program. For grades K–3.
Whole Brain Spelling	\$34.95	76950-600	subLOGIC	Apple II+, IIe, IIc	Two hundred ten-word lists in six different categories to help teach spelling skills.
Word Bank	\$49.95	43950-740	Learning Well	II+, IIe, IIc	Consists of four games that provide practice in basic sight word recognition and classification skills.

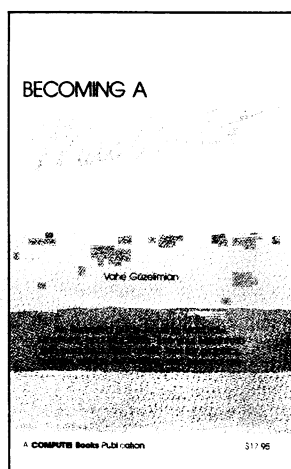


Product	Price	ISBN	Publisher/ Vendor	Systems	Description
Word Picture	\$34.95	7525-700	Bertamax	II, II+, IIe	Talking discovery program contains 100 picturable words. Develops vocabulary and spelling skills at a beginning level.
Writing 1	\$39.95	28087-950	Eduware Services	II, II+, IIe, IIc	The first volume in a five-volume series that teaches writing skills. It focuses on possessives, contractions, plurals, and more.
<b>Math</b>					
Advantage Geometry, Volume 1	\$29.10	5310-675	Arrakis	II+, IIe, IIc	Basic geometric notions include measure, basics of geometry, relations, and transformations.
Algebra	\$95.00	14850-021	Compress	II+, IIe, IIc	This is part of the Wepco Electronic Blackboard series concentrating on algebra.
Arithmetic Critters	\$49.00	54725-011	MECC	II, II+, IIe, IIc	Continues the animal theme started in <i>Counting Critters</i> . Helps young children master basic math skills. For grades K-2.
Classroom Activities Package	\$99.00	50225-087	MicroEd	II+, IIe, IIc	The whole class can participate using one computer and a set of activity sheets. For grades 3-9.
Decimal Skills	\$49.95	47479-223	Marshware	II+, IIe, IIc	Helps students grasp the fundamentals of adding, subtracting, multiplying, and dividing decimals.
First Men on the Moon Math	\$39.95	30848-260	Fisher-Price	II, II+, IIe, IIc	Based on the book by H. G. Wells and set below the far reaches of the lunar surface. For ages 9-12.
Fraction Bars Computer Programs—Subtraction	\$49.98	68831-260	Scott Resources	II+, IIe, IIc	Subtraction of fractions and mixed numbers is visually illustrated with fraction bars and number lines.
Geometry	\$99.95	08850-070	Brøderbund	Mac	More than 350 problems help students practice and learn geometry skills using the graphics on the Macintosh.
Graph-Calc	\$75.00	14850-428	Compress	II+, IIe, IIc	Lets students graph equations, solve equations, and work with derivatives and integrals.
Interpreting Graphs	\$59.00	77038-435	Sunburst	II+, IIe, IIc	Consists of two programs to familiarize students with the concepts of graphs. For grades 7-12.
MacEdge	\$49.95	81375-475	Think Educational Software	Mac	Contains eight reading and math programs for basic skills.
Mathdisk Four: Calculus	\$36.90	84075-495	University of Evansville	IIe, IIc	Enrichment mathematics grades 12-college: 43 individually copyable calculus programs written in Applesoft BASIC.
Math Magic	\$39.99	54362-500	Mindplay	II, II+, IIe, IIc	Lets you match play with student's hand/eye coordination, enter your own questions, control carrying and borrowing, and more.
Math Shop	\$49.95	68075-482	Scholastic	II+ (64K), IIe, IIc	Shopping-mall setting teaches students grades 6-9 basic mathematical skills such as proportions, fractions, measurement, addition, subtraction, and decimals.
Meg-A-Math Multiplication	\$34.95	50950-303	Micro Power & Light	II, II+, IIe, IIc	Offers various drill and practice formats and covers the basic function plotter.
Milt's Math Drills	\$79.95	34562-608	Hartley Courseware	II+, IIe, IIc	This six-disk package includes a diagnostic-testing disk, four practice disks, and a readiness-skills disk.
Number Munchers	\$49.00	54725-729	MECC	II, II+, IIe, IIc	A number product that proves mathematics can be fun. For grades 4-8.
Pinball I. Q.	\$17.95	50225-274	MicroEd	II+, IIe, IIc	Identify a single-digit quotient in division, using a one- or two-digit divisor. For grades 3-8.
Pizza Fractions	\$59.00	36562-575	Human Relations Media	II, II+, IIe, IIc	Students in grades 4-7 learn about fractions by slicing pizza at the "Pizza Institute."
Romper Room: I Love My Numbers	\$39.95	30838-070	First Star Software	II+, IIe, IIc	Clarifies the concepts behind simple mathematical operations.
Scarce City Motel	\$17.95	50225-458	MicroEd	II+, IIe, IIc	Maximize the earnings of a simulated business by equating supply with demand. For grades 4-9.
Stickybear Math	\$39.95	85825-676	Weekly Reader Family Software	II, II+, IIe, IIc	Allows children to practice multiplication and division. For ages 7 and up (to adult level).
Sum-It Mountain	\$17.95	50225-678	MicroEd	II+, IIe, IIc	Add nine numbers in a timed exercise, identifying a new sum after each addend. For grades 1-8.
Teasers by Tobbs	\$44.95	77038-876	Sunburst	II+, IIe, IIc	Meet Tobbs, who helps students think logically to solve addition and multiplication problems. For grades 4 and up (to adult level).
Worksheet Wizard II: Fractions	\$39.95	28075-661	Edusoft	II+, IIe, IIc	Gives students practice with their fraction skills.
<b>Science</b>					
Advantage Biology, Volume 1	\$29.10	5310-365	Arrakis	II+, IIe, IIc	Presents the anatomy of the respiratory system, the mechanics of breathing, and the principles underlying oxygen transport, control of respiration, and respiratory problems.
Anatomy Challenge	\$29.95	40875-100	Island Software	II+, IIe, IIc	A new way to review your knowledge of science.
Astronomy Disk	\$40.00	61918-234	Prentice-Hall College Division	II, II+, IIe	An introduction to important fundamentals of astrophysics and space exploration.
Body Systems Series	\$135.00	47479-180	Marshware	II+, IIe, IIc	Includes all four body systems—the respiratory system, bones and muscles, the stomach, and the heart—in its programs.
Botanical Gardens	\$59.00	77038-080	Sunburst	II+, IIe, IIc	Students can experiment with the growth of different plants while varying the environmental conditions.

# APPLE TITLES

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Clark and Kathy H. Kidd, 305 pages  
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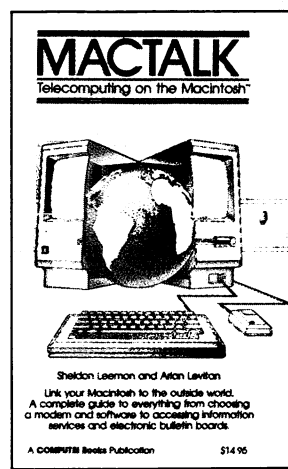
Thomas E. Enright, Joan Nickerson, and Anne Wayman, 173 pages  
An informative and easy-to-understand guide to telecomputing on the Apple, from selecting hardware and software to accessing large databases.

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### COMPUTE!'s Kids and the Apple

Edward H. Carlson, 255 pages  
An entertaining and easy-to-use book for kids ages 10-14 interested in learning BASIC programming on their Apple computers.

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### MacTalk: Telecomputing on the Macintosh

Sheldon Leemon and Arlan Levitan, 263 pages

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Product	Price	ISBN	Publisher/ Vendor	Systems	Description
Earthquake Lab, Module 2	\$39.95	N/A	Brøderbund	II+, IIe, IIc	Another lab module for <i>Science Toolkit</i> . Seismograph allows charting and graphing of earth tremors. Experiment guide included.
Exploring Heat Through Lessons and Labs	\$150.00	47750-220	D. C. Heath & Co.	II+, IIe, IIc	Presents the concept of heat energy through investigative experiments and discussions.
Exploring Your World: All About You & the Weather	\$44.95	33575-175	Grolier Electronic Publishing	II+, IIe, IIc	Helps teach children the concepts and vocabulary they need to discover the world around them.
Genetics	\$75.00	47750-255	D. C. Heath & Co.	II+, IIe, IIc	Gives students insight into genetic questions through the study of traits.
Great Knowledge Race: Earth Science Series, Version 1.0	\$49.00	31025-535	Focus Media	II+, IIe, IIc	Similar to Trivial Pursuit, this game challenges your knowledge of topics such as vocabulary, geography, sports, history, and more.
Introduction to General Chemistry #4—Atomic Weights	\$70.00	14850-494	Compress	II+, IIe, IIc	Shows students how to write chemical formulae for molecules, salts, and hydrates.
Lunar Explorer: A Space Flight Simulator	\$40.00	28337-450	Electric Transit	II, II+, IIe, IIc	A realtime simulation of piloting a lunar landing vehicle shown from the pilot's point of view.
Natural Causes	\$50.00	63918-500	Q.E.D. Computing	II series	A series of simulations to acquaint the biology student with the interrelationships of environment, predator, and prey, based on the moose and wolf populations of Isle Royale, Michigan.
Oceanography	\$27.00	456-495	Academic Hallmarks	II+, IIe, IIc	History of oceanography, oceans and seas, islands, sea water, ocean depths, land forms, beaches, sediments, currents, waves, and tides.
Speed and Motion, Module 1	\$39.95	N/A	Brøderbund	II+, IIe, IIc	Additional lab module for <i>Science Toolkit</i> . Includes tachometer, speedometer, and experiment guide. Set up speed traps, and see how fast someone pitches a ball, how fast a record moves, and more.
Stargazing	\$60.00	19050-456	Conduitt	II, II+, IIe, IIc	Helps students identify constellations and other celestial patterns.
The Digestive System: The Disappearing Dinner	\$39.95	47479-680	Marshware	II+, IIe, IIc	Stanley Stomach helps students with new words and concepts that teach important basics about the digestive and circulatory system.

## Social Science

Computerized Atlas	\$69.95	72493-001	Software Concepts	Mac	Electronic atlas of all 50 states and every country. Magnify maps, call up fact sheets, and find the distance between two points.
49ers	\$89.95	34562-005	Hartley Courseware	II+, IIe, IIc	Students chart their own courses in discovering and settling California.
License to Kill: The Problem of Drunk Driving	\$29.95	50225-220	MicroEd	II+, IIe, IIc	Combines newspaper tabloids with microcomputer programs to explore a current social and political problem. For both high school students and adults.
Maps & Method	\$34.95	50950-301	Micro Power & Light	II+, IIe, IIc	A set of two introductory-level programs. The first is map reading and the second is the scientific method.
MECC Dataquest: The Fifty States	\$49.00	54725-064	MECC	II series with at least 64K	Students learn to form questions about the 50 states, look for answers in a database, and formulate hypotheses by using the search results.
Race for the West	\$89.95	34562-728	Hartley Courseware	II+, IIe, IIc	Students race against the English and French to explore and map the Northwest.
Time Tunnel: European History, Version 1.0	\$95.00	31025-640	Focus Media	II+, IIe, IIc	An in-depth historical coverage of the important people who helped shape history. Covers ancient times to present.
Travels with Za-Zoom: Around the U.S.	\$39.00	31025-895	Focus Media	II+, IIe, IIc	A game of geography and world cultures; your children will find themselves flying over strange lands and faraway places.
U.S. History	\$39.95	34562-775	Hartley Courseware	II+, IIe, IIc	Get your students involved in preparing their own review questions for history class.
Voyages of Discovery	\$69.00	36562-700	HRM Software	II, II+, IIe, IIc	Colorful game that recreates the Lewis and Clark expedition of discovery in 1804. Outfit the expedition and head west. Map-reading, reading, and problem-solving skills practice.
Where in the USA Is Carmen San Diego?	\$44.95	N/A	Brøderbund	II+, IIe, IIc	Learn all about the USA in this entertaining game of mystery and travel. Children use <i>Fodor's USA Travel Guide</i> to visit 51 animated cities. Multiple villains, multiple levels.

## For Teachers and Counselors

Final Grade	\$18.95	53912-250	Midwest Software	II+, IIe, IIc	Tool for teachers who don't want to be tied to the computer all semester but want a quick and accurate assessment of grades.
Gradebook Plus Pro Version	\$59.95	33575-262	Grolier Electronic Publishing	II+, IIe, IIc	An unparalleled record-keeping program which keeps up-to-the-minute information on all of your students and classes.
Grade Buster Plus	\$79.95	33337-250	Grade Busters Plus	IIc, IIe	Assembly language program that provides a spreadsheet-style printout of students' names, grades, and assignments.
Heath Chemistry Lab Assistant	\$90.00	47750-275	D. C. Heath & Co.	II+, IIe, IIc	This program allows teachers to keep track of various classes' experiments and to maintain a running inventory of lab supplies.

Product	Price	ISBN	Publisher/ Vendor	Systems	Description
Quickflash	\$49.00	54725-322	MECC	II, II+, IIe, IIc	Allows you to produce flashcards on the computer for virtually any subject or grade level.
Right Job Application	\$59.00	11366-580	Career Development Software	II	This program explores the major components of the job application.
Right Resume Writer II	\$98.00	11366-620	Career Development Software	II, IIe, IIc	Allows the user to tailor-make four types of resumes.
Spelling Worksheet Generator	\$54.99	76250-505	Sterling Swift Publishing	II+, IIe, IIc	Creates spelling worksheets from lists of up to 40 words or syllables, which the teacher can save.
Test It! Test Authoring System	\$49.95	28075-710	Edusoft	II+, IIe, IIc	This program lets teachers build a bank of test questions and create personalized tests using multiple choice, true/false, fill-in-the-blank, modified true/false, and essay.
Voice Reading Ability Drill	\$295.00	12405-200	Chatterbox Voice Learning Systems	II, II+, IIe	A voice input/output and software/hardware system for teaching reading and language with Apple computers.
<b>Other Basic Skills</b>					
Ant Farm	\$59.00	77038-018	Sunburst	II+, IIe, IIc	Can your students get nine ants inside an ant farm to work together in a chain to perform tasks? For grades 3 and up (to adult level).
Bake and Taste	\$39.99	54362-225	Mindplay	II, II+, IIe, IIc	Includes setting for cook, chef, or master chef recipes, plus help options for those who need assistance using fractions to measure.
Bank Street School Filer	\$99.00	77038-053	Sunburst	II+, IIe, IIc	A database program for schools that lets teachers and students custom-design reports, and record, table, or make file revisions.
Betabots	\$51.00	47750-125	D. C. Heath & Co.	II+, IIe, IIc	A typing program which helps build typing skills.
Crystal Ball	\$49.00	43873-135	The Learning Seed	II+, IIe, IIc	Students teach themselves some of the financial facts of life in this series of ten brief simulations.
Dr. Seuss Fix-Up the Mix-Up Puzzler	\$41.95	11670-141	CBS Software	II+, IIe, IIc	An electric jigsaw puzzle featuring six animated storybook characters.
Glidepath	\$59.00	36562-315	HRM Software	II+, IIe, IIc	This program teaches the basics of flight physics by simulating the flight of a glider and allowing students to design, test, and redesign their own glider models.
Graphics Library #4	\$24.95	N/A	Brøderbund	II+, IIe, IIc	Fourth in a series of <i>Print Shop</i> graphics art collections. Clip the art, then paste in any <i>Print Shop</i> creation.
Health Watch	\$49.95	43950-330	Learning Well	II+, IIe, IIc	Three games—Eating Well, Brush Up, and Fitness Fun—teach students in grades 3–8 good health habits.
Homeworker	\$89.95	N/A	Davidson & Assoc.	IIe, IIc	Integrated program designed to help students study more efficiently. Six modules offer tools for writing, outlining, memorizing, scheduling, documenting, and calculating. Files are <i>AppleWorks</i> -compatible.
Iggy's Gnees	\$59.00	77038-420	Sunburst	II+, IIe, IIc	Iggy the Inchworm needs help arranging some brightly colored shapes. For grades 1–4.
Knowledge Bowl #1	\$27.00	456-310	Academic Hallmarks	II+, IIe, IIc	An excellent resource for schools involved in academic competitions.
Learning to Cope with Pressure	\$99.00	77038-476	Sunburst	II+, IIe	A package which uses a biofeedback device (handheld galvanic skin-resistance monitor) and games to help students understand and learn to manage the stress and pressures of everyday life.
Match-on-a-Mac	\$39.95	82981-440	Teach Yourself by Computer Software	Mac	Eleven games for children in preschool–grade 2 teach recognition and association skills as well as how to use the mouse and other Macintosh tools.
Muppetville	\$59.00	77038-580	Sunburst	IIe, IIc	Identifying and classifying shapes, colors and numbers. For children in grade levels preschool–grade 1.
Picture Perfect	\$39.99	54362-550	Mindplay	II, II+, IIe, IIc	Easy-to-use picture menu with array of options including lines, points, boxes, and color, plus a picture library for storytelling.
Print Shop for the Macintosh	\$79.95	N/A	Brøderbund	Mac (512K), Mac+	Helps create greeting cards, banners, signs, and more. Includes over 150 graphics. Imports <i>MacDraw</i> and <i>MacPaint</i> designs. Supports <i>LaserWriter</i> .
Simulation Construction Kit	\$79.95	34562-779	Hartley Courseware	II+, IIe, IIc	Assists students in computer literacy. Get students involved in their own projects as they learn about the computer.
Stickybear Basic	\$39.95	85825-590	Weekly Reader Family Software	II, II+, IIe, IIc	An introduction to the BASIC programming language.
Success with Typing	\$49.95	00617-618	Scholastic Software	IIc, IIe	A touch-typing course for students in grades 6–12, that also teaches the basics of word processing and database management.
The Electric Crayon: ABC's	\$19.95	66318-150	Brian A. Rice	IIe, IIc	Children ages 4 and up can learn their ABC's by coloring the 26 alphabet pictures on the screen with a "crayon" they control using a joystick, mouse, or Koala Pad.
Thinkworks	\$125.00	48875-800	Megahaus	IIe, IIc	An outline generator which lets you create outline documents that can easily be changed, updated, printed or imported to <i>AppleWorks</i> .
Type!	\$44.95	N/A	Brøderbund	IIe, IIc	Learn to type with drills using full sentences. As you type, the program tells you how fast you're typing and suggests practices in certain areas.

# The Story Machine

Ed Thompson

*Children love to create imaginary tales and tell them to others. This word processor-like program lets children of all ages compose stories up to 20 pages long, view them as they automatically appear on the screen, and even print them out. "The Story Machine" is just as useful for writing and printing notes, short letters, and school assignments. For all Apple II computers using DOS 3.3 or ProDOS.*

Stories about how the elephant got a trunk and tusks. Silly poems and rhymes. Stupid pet jokes. Letters to Grandma and Grandpa. That report on Jefferson for school. All these, and much more, can be written with "The Story Machine," a word processor for children. Put your child in front of the Apple computer, load The Story Machine, and watch imagination go to work.

The Story Machine has easy-to-understand commands and lots of features. Like saving and loading completed work to and from disk. And printing what's on the screen. And making the computer automatically "flip" the pages of a long story—at *your* reading speed. It's so simple to use that you may want to write with it yourself, saving your full-featured word processor for those really complex jobs.

## You May Have To Type

Though The Story Machine was created for children, you'll probably have to type it in for

them if they've not entered a program before. (No matter who enters the program, read "Guide to Typing In Programs," another article you'll find in this issue.)

Type in and save Program 1 (The Story Machine Loader) to disk. Save it as STORY. Next, type in and save Program 2 (The Story Machine) to disk. Save this file as STORY.MACHINE. Type in and save Program 3 (The Story Machine Menu) to disk. Save this file as MENU. Now, type

**RUN MENU** <Press Return>

and the disk drive will whirl a bit. When it's done, enter CATALOG and press Return, and you should see a new file called STORY.MENU on the disk. You're ready to start writing.

## Write Right

Load and run The Story Machine by typing

**RUN STORY** <Press Return>

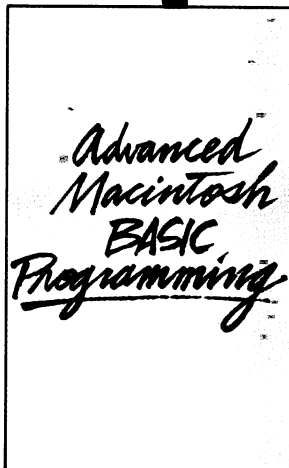
and in a moment your Apple's screen will show a message. Read it through; then press Y if you have a printer connected to your computer or N if you don't. Another message appears and asks that you insert a data disk in the drive. You don't have to do this, but it's a good idea to keep your story files on a separate disk, just to make sure nothing happens to the disk which contains The Story Machine. Press any key when you're ready.



All  
The Best

# APPLE INFORMATION

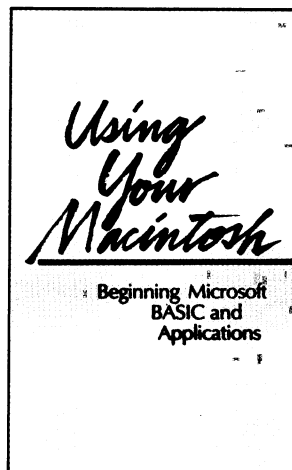
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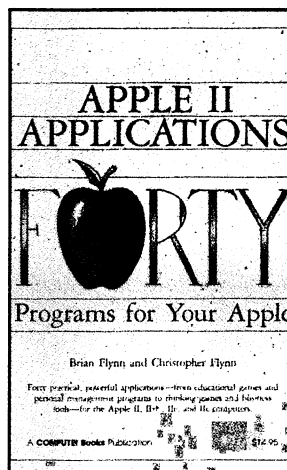
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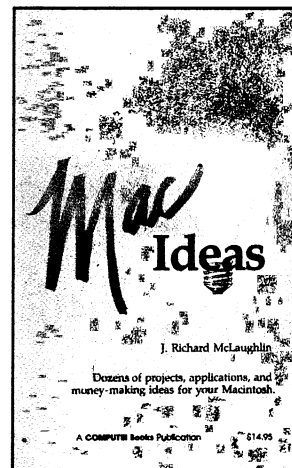
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**Figure 1: The Story Machine's Blank Page**



*Just begin typing on the "The Story Machine's" blank page. Commands to print the page, see the menu, and erase what's on the page are conveniently listed at the bottom of the screen.*

Start typing. It's that simple. If you make a mistake and notice it right away, press the Delete key to back up the cursor. When you use Delete, characters are erased as the cursor moves to the left. (If the cursor is at the far left when you press Delete, it moves to the far right of the next line up.)

Note: If you're using an Apple II+ computer, which doesn't have a Delete key, correct mistakes with the next method.

If you notice a mistake after you've typed awhile, you probably won't want to erase everything to get to the error. Just use the cursor keys (Apple II+ owners can press the Ctrl and J keys to move the cursor up, the Ctrl and K keys to move the cursor down) to move the cursor anywhere on the screen. Move the cursor right from the right side or left from the left (or even up from the top or down from the bottom), and it appears on the opposite side. Use this feature to move the cursor quickly to the other side of the screen. When the cursor's where you want it, start typing again. Anything you type replaces what was there before.

If you have an Apple IIe or IIc, you can type in uppercase and lowercase. Just make sure the Caps Lock key is up. Or, if you want, you can type everything in all uppercase (you have to do it this way if you're using an Apple II+ computer).

As the letters you type approach the right side of the screen (there should be a border visible), press the Return key and the cursor moves down to the next line. If you don't press Return, a word may be split between lines. If you want, you can hyphenate words yourself

by splitting them into syllables and inserting the hyphen (-).

You can keep typing until you fill the entire page. Don't type more than will show on the screen, though.

### **Save A Page**

Once you've filled a page, press the Ctrl and S keys at the same time. The message FILE TO SAVE: appears at the bottom of the screen. Type in a name for that page (use the Delete key to erase mistakes) and press Return when you're sure there's a disk in the drive.

If you're writing a long story, one that will take up more than one page, name the page like this:

**STORY.1**

where STORY is the name of the story, and 1 is the page number. This way, your computer will be able to show your story in the right order.

### **Erase And Write More**

You've written one page, but want to write more. It's simple. Press the Ctrl and W keys at the same time, and the page on the screen is erased. Now you've got a blank page. Begin typing where you left off. Keep writing your story and saving each page until you're through. You can have up to 20 pages for each story.

### **Reading Your Story**

Now that your story is finished, you'll probably want to read it and have others read it, too. That's easy.

Make sure the disk with your story's pages is in the disk drive. Press the Ctrl and R (for Read) keys at the same time. Type the story's name and press Return. You have to answer two other questions—how many pages are in the story (1–20) and how fast you want to read the story (0–5). Press a number key and hit Return to answer both questions. (Pressing the 0 key means that each page stays on the screen longer; hitting the 5 key means that each page is on the screen just a short time.)

The disk whirls and the first page appears. After a while (depending on how you answered the reading speed question), the screen goes blank and the next page comes up. When the story's through, the normal screen returns.

### **Roll The Presses**

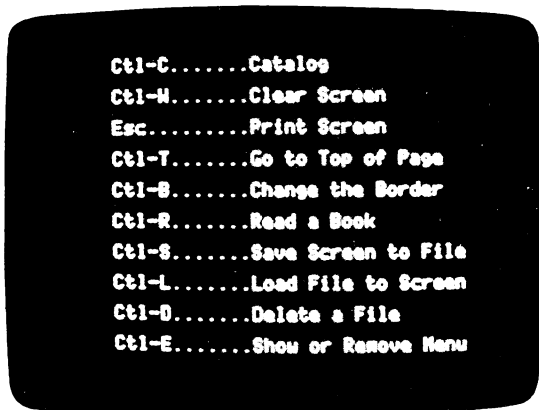
You can print anything you've written with The Story Machine, as long as you have a printer connected to your computer. With a page

visible on the screen, press the Esc key and, assuming the printer is turned on, what you see on the screen will be printed on paper. Unfortunately, there's no way to automatically print a long story (as there is a way to read one), so you'll have to load one page at a time and then print it.

## Special Extras

The Story Machine has lots of extras. You can see a list, or menu, of them at any time just by pressing the Ctrl and E keys at the same time.

Figure 2: The Story Machine's Menu



You can look at this menu by pressing the Ctrl and E keys. It shows you what options you can use with "The Story Machine." Press any key to return to the main screen.

**CTRL-C** Displays a catalog of all the files on the disk in the drive. Use this to find out what pages you have on the disk and what they're named.

**CTRL-W** Wipes the screen clear.

**ESC** Prints whatever is on the screen.

**CTRL-T** Sends the cursor to the top of the page.

**CTRL-B** Changes the border (there are three—two designs and one invisible). Choose the invisible border if you don't want one to print when you press Esc.

**CTRL-R** Reads a story.

**CTRL-S** Saves a page.

**CTRL-L** Loads a page back into the computer.

**CTRL-D** Deletes a page. If you press this combination and then type in the name of the page you want to delete, the page will be erased from the disk. *You can't change your mind once you type in the name of the page and press Return.*

**CTRL-E** Flips back and forth between the main story page and the menu.

The Story Machine is a great tool for writing almost anything. You can write letters to friends, stories about yourself, poems that rhyme, even school assignments.

## Program 1: The Story Machine Loader

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following programs.

```
3F 10 POKE 103,1: POKE 104,12: POKE 3072,
    0: PRINT : PRINT CHR$ (4)"RUN STORY
    .MACHINE"
```

## Program 2: The Story Machine

```
50 10 POKE 48984, INT ( PEEK (48984) / 16
    ) * 16: REM PRODOS ONLY! SET BITMAP
    TO ALLOW LOAD TO SCREEN
94 20 PRINT CHR$ (4);"BLOAD STORY.MENU,A$
    B00"
27 25 DIM ST(64)
54 30 B1$ = " ESC TO PRINT    CTL-E MENU
    CTL-W CLEAR"
82 40 B2$ = "
    "
8C 50 DL$ = " "
57 60 TEXT : HOME
F1 70 PRINT : PRINT : PRINT : PRINT "
    STORY MACHINE"
89 80 PRINT : PRINT : PRINT : PRINT "WHEN
    USING STORY MACHINE, USE FILE NAME
    S": PRINT "LIKE STORY.5,  WHERE ST
    ORY IS THE BOOK": PRINT : PRINT "NA
    ME AND .5 IS THE PAGE.  YOU MAY HAV
    E"
E2 90 PRINT : PRINT "A MAXIMUM OF 20 PAGE
    S PER BOOK."
39 100 PRINT : PRINT : PRINT : PRINT "ARE
    YOU USING A PRINTER Y/N? ": GET P
    P$
24 110 IF PP$ = "Y" GOTO 140
F9 120 IF PP$ = "N" GOTO 140
90 130 GOTO 100
E8 140 PRINT
35 150 PRINT : PRINT : PRINT : INVERSE :
    PRINT "NOW REMOVE THIS DISK": NORM
    AL : PRINT : INVERSE : PRINT "AND
    INSERT YOUR DATA DISK": NORMAL
6A 160 PRINT : PRINT
65 170 INVERSE : PRINT "HIT ANY KEY WHEN
    READY": NORMAL : GET K$
8C 180 Z = - 16336
E6 190 GOSUB 2340
68 200 ONERR GOTO 1300
FF 210 IF PP$ = "N" GOTO 270
3B 220 PRINT : PRINT CHR$ (4)"PR#1"
0A 230 PRINT CHR$ (27) + CHR$ (99);
D2 240 MR$ = " 24": PRINT CHR$ (27) + CHR
    $ (76);MR$
EA 250 PRINT CHR$ (27) + CHR$ (110)
41 260 PRINT : PRINT CHR$ (4)"PR#0"
63 270 TEXT : HOME
A0 280 KX = 2:KY = 2
67 290 B1$ = " ESC TO PRINT    CTL-E MENU
    CTL-W CLEAR"
```



```

02 300 VTAB 1: HTAB 1: PRINT "*****
* STORY MACHINE *****"
9F 310 VTAB 22: FOR T = 1 TO 40: PRINT "*"
";: NEXT T
CB 320 VTAB 23: HTAB 1: PRINT B1$
FE 330 FOR T = 2 TO 21: VTAB T: PRINT "*"
: VTAB T: HTAB 40: PRINT "*": NEXT
T
36 340 BA = 1
CB 350 VTAB KY: HTAB KX: GET AN$
03 360 AN = ASC (AN$)
0A 370 IF AN < 32 THEN 400
6F 380 IF AN = 127 THEN 400
DD 390 VTAB KY: HTAB KX: PRINT CHR$ (AN):
KX = KX + 1: GOTO 490
68 400 IF AN = 11 THEN KY = KY - 1
51 410 IF AN = 8 THEN KX = KX - 1
9F 420 IF AN = 27 THEN GOSUB 610
DA 430 IF AN = 21 THEN KX = KX + 1
3E 440 IF AN = 13 THEN KY = KY + 1: KX = 2
68 450 IF AN = 10 THEN KY = KY + 1
31 460 IF AN = 23 THEN GOSUB 2340: GOTO 2
70
8E 470 IF AN = 20 THEN KY = 2: KX = 2
91 480 IF KX < 2 THEN KX = 39: KY = KY - 1
BB 490 IF KX > 39 THEN KX = 2: KY = KY + 1
CC 500 IF KY > 21 THEN KY = 2
64 510 IF KY < 2 THEN KY = 21
EE 520 IF AN = 3 THEN GOTO 2210
03 530 IF AN = 5 THEN GOSUB 1250
EB 540 IF AN = 4 THEN GOSUB 1140
AD 550 IF AN = 2 THEN GOSUB 900
52 560 IF AN = 18 THEN GOTO 1510
C5 570 IF AN = 19 THEN GOSUB 720
16 580 IF AN = 12 THEN GOSUB 1040
36 590 IF AN = 127 THEN GOSUB 2120
95 600 GOTO 350
03 610 REM IMAGEWRITER TEXT SCREEN DUMP
3F 620 PRINT : PRINT CHR$ (4) "PR#1"
4B 630 PRINT : PRINT : PRINT : PRINT : PR
INT : PRINT : PRINT : PRINT
3E 640 PRINT CHR$ (9) + CHR$ (52) + CHR$
(48) + CHR$ (78)
42 650 FOR T = 1 TO 22: READ A1: FOR CO =
A1 TO A1 + 39: PRINT CHR$ ( PEEK
(CO));: NEXT : PRINT : NEXT
FB 670 PRINT CHR$ (12)
49 680 PRINT : PRINT CHR$ (4) "PR#0"
D5 690 RESTORE
17 700 RETURN
ED 710 DATA 1024,1152,1280,1408,1536,1664
,1792,1920,1064,1192,1320,1448,157
6,1704,1832,1960,1104,1232,1360,14
88,1616,1744,1872,2000
B5 720 VTAB 23: HTAB 1: PRINT "
"
CB 730 CA = 3
14 740 VTAB 23: HTAB 1: PRINT B2$
F4 750 VTAB 23: HTAB 1: PRINT CHR$ (7)
DC 760 VTAB 23: HTAB 1: PRINT " FILE TO S
AVE: ": GOSUB 1760
B2 770 IF AA$ = "QUIT" THEN GOTO 880
BC 780 PRINT CHR$ (4); "BLOAD "AA$",A$6000
"
1E 790 VTAB 23: HTAB 1: PRINT B2$
A0 800 VTAB 23: HTAB 1: PRINT CHR$ (7): V
TAB 23: HTAB 1: PRINT CHR$ (7): VT
AB 23: HTAB 1: PRINT "FILE ALREADY
EXISTS! REPLACE Y/N? ";: GET RA$
31 810 IF RA$ = "N" THEN GOTO 870
1F 820 IF RA$ = "Y" THEN GOTO 850

```

```

A1 830 IF RA$ = "y" THEN GOTO 850
A0 840 GOTO 740
17 850 VTAB 23: HTAB 1: PRINT B2$
CA 860 PRINT CHR$ (4); "BSAVE "AA$",A$400,
L$400"
1B 870 VTAB 23: HTAB 1: PRINT B2$
DC 880 VTAB 23: HTAB 1: PRINT B1$
D1 890 CA = 0: RETURN
68 900 BA = BA + 1
E3 910 IF BA = 2 THEN GOTO 990
37 920 IF BA > 3 THEN GOTO 300
C0 930 VTAB 1: HTAB 1: PRINT "+1234567890
1234567890123456789012345678+"
FE 940 VTAB 22: HTAB 1: PRINT "+123456789
01234567890123456789012345678": VT
AB 22: HTAB 40: PRINT "+"
1F 950 FOR T = 2 TO 21: TT = T - 1: IF TT
> 9 THEN TT = T - 11
F4 960 IF TT = 10 THEN TT = 0
62 970 VTAB T: HTAB 1: PRINT TT: VTAB T:
HTAB 40: PRINT TT: NEXT T
8E 980 VTAB 23: PRINT " ESC TO PRINT CT
L-E MENU CTL-W CLEAR": RETURN
A3 990 VTAB 1: HTAB 1: PRINT "
"
13 1000 VTAB 22: FOR T = 1 TO 40: PRINT "
";: NEXT T
31 1010 VTAB 23: PRINT "
"
81 1020 FOR T = 2 TO 21: VTAB T: PRINT "
": VTAB T: HTAB 40: PRINT " ": NE
XT T
DD 1030 RETURN
CB 1040 VTAB 23: HTAB 1: PRINT B2$
AC 1050 CA = 2
D3 1060 VTAB 23: HTAB 1: PRINT B2$
95 1070 VTAB 23: HTAB 1: PRINT CHR$ (7)
7C 1080 VTAB 23: HTAB 1: PRINT " FILE TO
LOAD: ": GOSUB 1760
85 1090 IF AA$ = "QUIT" THEN GOTO 1110
AC 1092 REM STORE THE GAPS BEFORE LOADING
SCREEN
38 1093 J = - 7: RESTORE
C0 1094 READ A: J = J + 8: IF A = 1064 THE
N GOTO 1100
96 1095 FOR I = 0 TO 7: ST(J + I) = PEEK (
A + 120 + I): NEXT : GOTO 1094
50 1100 PRINT CHR$ (4); "BLOAD "AA$",A$400
"
26 1102 REM PUT THE VALUES BACK IN THE GA
PS
16 1103 J = - 7: RESTORE
4A 1104 READ A: J = J + 8: IF A = 1064 THE
N RESTORE : GOTO 1110
49 1105 FOR I = 0 TO 7: POKE A + 120 + I,
ST(J + I): NEXT : GOTO 1104
41 1110 VTAB 23: HTAB 1: PRINT B1$
A1 1120 CA = 0
DF 1130 RETURN
CD 1140 VTAB 23: HTAB 1: PRINT B2$
2E 1150 CA = 1
D5 1160 VTAB 23: HTAB 1: PRINT B2$
97 1170 VTAB 23: HTAB 1: PRINT CHR$ (7)
40 1180 VTAB 23: HTAB 1: PRINT "FILE TO D
ELETE? ": GOSUB 1760
89 1190 IF AA$ = "QUIT" THEN GOTO 1210
4A 1200 PRINT CHR$ (4); "DELETE "AA$
C3 1210 VTAB 23: HTAB 1: PRINT B2$
47 1220 VTAB 23: HTAB 1: PRINT B1$
A7 1230 CA = 0
E5 1240 RETURN

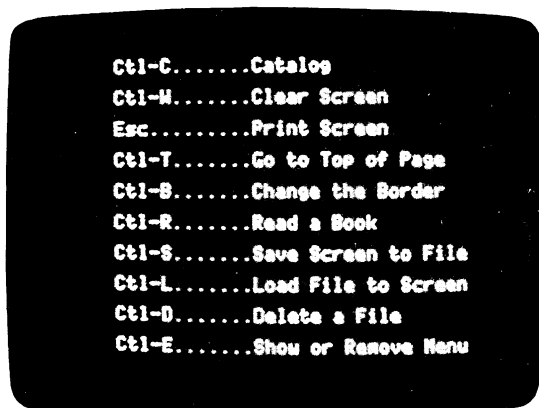
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    B00"
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54 30 B1$ = " ESC TO PRINT    CTL-E MENU
    CTL-W CLEAR"
82 40 B2$ = "
    "
80 50 DL$ = " "
57 60 TEXT : HOME
F1 70 PRINT : PRINT : PRINT : PRINT "
    STORY MACHINE"
89 80 PRINT : PRINT : PRINT : PRINT "WHEN
    USING STORY MACHINE, USE FILE NAME
    S": PRINT "LIKE STORY.5, WHERE ST
    ORY IS THE BOOK": PRINT : PRINT "NA
    ME AND .5 IS THE PAGE. YOU MAY HAV
    E"
E2 90 PRINT : PRINT "A MAXIMUM OF 20 PAGE
    S PER BOOK."
39 100 PRINT : PRINT : PRINT : PRINT "ARE
    YOU USING A PRINTER Y/N? ": GET P
    P$
24 110 IF PP$ = "Y" GOTO 140
F9 120 IF PP$ = "N" GOTO 140
90 130 GOTO 100
E8 140 PRINT
35 150 PRINT : PRINT : PRINT : INVERSE :
    PRINT "NOW REMOVE THIS DISK": NORM
    AL : PRINT : INVERSE : PRINT "AND
    INSERT YOUR DATA DISK": NORMAL
6A 160 PRINT : PRINT
65 170 INVERSE : PRINT "HIT ANY KEY WHEN
    READY": NORMAL : GET K$
0C 180 Z = - 16336
E6 190 GOSUB 2340
68 200 ONERR GOTO 1300
FF 210 IF PP$ = "N" GOTO 270
3B 220 PRINT : PRINT CHR$ (4)"PR#1"
0A 230 PRINT CHR$ (27) + CHR$ (99);
D2 240 MR$ = " 24": PRINT CHR$ (27) + CHR
    $ (76);MR$
EA 250 PRINT CHR$ (27) + CHR$ (110)
41 260 PRINT : PRINT CHR$ (4)"PR#0"
63 270 TEXT : HOME
A0 280 KX = 2:KY = 2
67 290 B1$ = " ESC TO PRINT    CTL-E MENU
    CTL-W CLEAR"
```

```

02 300 VTAB 1: HTAB 1: PRINT "*****
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";: NEXT T
CB 320 VTAB 23: HTAB 1: PRINT B1$
FE 330 FOR T = 2 TO 21: VTAB T: PRINT "*"
: VTAB T: HTAB 40: PRINT "*": NEXT
T
36 340 BA = 1
CB 350 VTAB KY: HTAB KX: GET AN$
03 360 AN = ASC (AN$)
0A 370 IF AN < 32 THEN 400
6F 380 IF AN = 127 THEN 400
DD 390 VTAB KY: HTAB KX: PRINT CHR$ (AN):
KX = KX + 1: GOTO 490
68 400 IF AN = 11 THEN KY = KY - 1
51 410 IF AN = 8 THEN KX = KX - 1
9F 420 IF AN = 27 THEN GOSUB 610
DA 430 IF AN = 21 THEN KX = KX + 1
3E 440 IF AN = 13 THEN KY = KY + 1: KX = 2
68 450 IF AN = 10 THEN KY = KY + 1
31 460 IF AN = 23 THEN GOSUB 2340: GOTO 2
70
8E 470 IF AN = 20 THEN KY = 2: KX = 2
91 480 IF KX < 2 THEN KX = 39: KY = KY - 1
BB 490 IF KX > 39 THEN KX = 2: KY = KY + 1
CC 500 IF KY > 21 THEN KY = 2
64 510 IF KY < 2 THEN KY = 21
EE 520 IF AN = 3 THEN GOTO 2210
03 530 IF AN = 5 THEN GOSUB 1250
E8 540 IF AN = 4 THEN GOSUB 1140
AD 550 IF AN = 2 THEN GOSUB 900
52 560 IF AN = 18 THEN GOTO 1510
C5 570 IF AN = 19 THEN GOSUB 720
16 580 IF AN = 12 THEN GOSUB 1040
36 590 IF AN = 127 THEN GOSUB 2120
95 600 GOTO 350
03 610 REM IMAGEWRITER TEXT SCREEN DUMP
3F 620 PRINT : PRINT CHR$ (4) "PR#1"
4B 630 PRINT : PRINT : PRINT : PRINT : PR
INT : PRINT : PRINT : PRINT
3E 640 PRINT CHR$ (9) + CHR$ (52) + CHR$
(48) + CHR$ (78)
42 650 FOR T = 1 TO 22: READ A1: FOR CO =
A1 TO A1 + 39: PRINT CHR$ ( PEEK
(CO));: NEXT : PRINT : NEXT
FB 670 PRINT CHR$ (12)
49 680 PRINT : PRINT CHR$ (4) "PR#0"
D5 690 RESTORE
17 700 RETURN
ED 710 DATA 1024,1152,1280,1408,1536,1664
,1792,1920,1064,1192,1320,1448,157
6,1704,1832,1960,1104,1232,1360,14
88,1616,1744,1872,2000
85 720 VTAB 23: HTAB 1: PRINT "
"
CB 730 CA = 3
14 740 VTAB 23: HTAB 1: PRINT B2$
F4 750 VTAB 23: HTAB 1: PRINT CHR$ (7)
DC 760 VTAB 23: HTAB 1: PRINT " FILE TO S
AVE: ": GOSUB 1760
82 770 IF AA$ = "QUIT" THEN GOTO 880
8C 780 PRINT CHR$ (4); "BLOAD "AA$",A$4000
"
1E 790 VTAB 23: HTAB 1: PRINT B2$
A0 800 VTAB 23: HTAB 1: PRINT CHR$ (7): V
TAB 23: HTAB 1: PRINT CHR$ (7): VT
AB 23: HTAB 1: PRINT "FILE ALREADY
EXISTS! REPLACE Y/N? ";: GET RA$
31 810 IF RA$ = "N" THEN GOTO 870
1F 820 IF RA$ = "Y" THEN GOTO 850

```

```

A1 830 IF RA$ = "Y" THEN GOTO 850
A0 840 GOTO 740
17 850 VTAB 23: HTAB 1: PRINT B2$
CA 860 PRINT CHR$ (4); "BSAVE "AA$",A$400,
L$400"
1B 870 VTAB 23: HTAB 1: PRINT B2$
DC 880 VTAB 23: HTAB 1: PRINT B1$
D1 890 CA = 0: RETURN
68 900 BA = BA + 1
E3 910 IF BA = 2 THEN GOTO 990
37 920 IF BA > 3 THEN GOTO 300
C0 930 VTAB 1: HTAB 1: PRINT "+1234567890
1234567890123456789012345678+"
FE 940 VTAB 22: HTAB 1: PRINT "+123456789
01234567890123456789012345678": VT
AB 22: HTAB 40: PRINT "+"
1F 950 FOR T = 2 TO 21: TT = T - 1: IF TT
> 9 THEN TT = T - 11
F4 960 IF TT = 10 THEN TT = 0
62 970 VTAB T: HTAB 1: PRINT TT: VTAB T:
HTAB 40: PRINT TT: NEXT T
8E 980 VTAB 23: PRINT " ESC TO PRINT CT
L-E MENU CTL-W CLEAR": RETURN
A3 990 VTAB 1: HTAB 1: PRINT "
"
13 1000 VTAB 22: FOR T = 1 TO 40: PRINT "
";: NEXT T
31 1010 VTAB 23: PRINT "
"
81 1020 FOR T = 2 TO 21: VTAB T: PRINT "
": VTAB T: HTAB 40: PRINT " ": NE
XT T
DD 1030 RETURN
CB 1040 VTAB 23: HTAB 1: PRINT B2$
AC 1050 CA = 2
D3 1060 VTAB 23: HTAB 1: PRINT B2$
95 1070 VTAB 23: HTAB 1: PRINT CHR$ (7)
7C 1080 VTAB 23: HTAB 1: PRINT " FILE TO
LOAD: ": GOSUB 1760
85 1090 IF AA$ = "QUIT" THEN GOTO 1110
AC 1092 REM STORE THE GAPS BEFORE LOADING
SCREEN
38 1093 J = - 7: RESTORE
C0 1094 READ A: J = J + 8: IF A = 1064 THE
N GOTO 1100
96 1095 FOR I = 0 TO 7: ST(J + I) = PEEK (
A + 120 + I): NEXT : GOTO 1094
50 1100 PRINT CHR$ (4); "BLOAD "AA$",A$400
"
26 1102 REM PUT THE VALUES BACK IN THE GA
PS
16 1103 J = - 7: RESTORE
4A 1104 READ A: J = J + 8: IF A = 1064 THE
N RESTORE : GOTO 1110
49 1105 FOR I = 0 TO 7: POKE A + 120 + I,
ST(J + I): NEXT : GOTO 1104
41 1110 VTAB 23: HTAB 1: PRINT B1$
A1 1120 CA = 0
DF 1130 RETURN
CD 1140 VTAB 23: HTAB 1: PRINT B2$
2E 1150 CA = 1
D5 1160 VTAB 23: HTAB 1: PRINT B2$
97 1170 VTAB 23: HTAB 1: PRINT CHR$ (7)
40 1180 VTAB 23: HTAB 1: PRINT "FILE TO D
ELETE? ": GOSUB 1760
89 1190 IF AA$ = "QUIT" THEN GOTO 1210
4A 1200 PRINT CHR$ (4); "DELETE "AA$
C3 1210 VTAB 23: HTAB 1: PRINT B2$
47 1220 VTAB 23: HTAB 1: PRINT B1$
A7 1230 CA = 0
E5 1240 RETURN

```



```

6F 1250 POKE - 16368,0
2C 1260 POKE - 16299,0
F6 1270 GET X$
8A 1280 POKE - 16300,0
F9 1290 RETURN
4F 1300 Y = PEEK (222)
A4 1310 CALL - 3288
EC 1320 IF Y = 6 THEN GOTO 1360
39 1330 IF Y = 11 THEN GOTO 1440
08 1340 IF Y = 10 THEN GOTO 1410
88 1350 GOTO 1470
D5 1360 IF CA = 1 THEN GOTO 1160
D3 1370 IF CA = 2 THEN GOTO 1060
A7 1380 IF CA = 3 THEN GOTO 850
F7 1390 IF CA = 4 THEN GOTO 1740
76 1400 GOTO 1470
C3 1410 IF CA = 1 THEN PRINT CHR$ (4); "UN
LOCK "AA$": GOTO 1200
18 1420 IF CA = 3 THEN PRINT CHR$ (4); "UN
LOCK "AA$": GOTO 860
82 1430 GOTO 1470
CF 1440 IF CA = 1 THEN GOTO 1160
CD 1450 IF CA = 2 THEN GOTO 1060
95 1460 IF CA = 3 THEN GOTO 740
BB 1470 VTAB 23: HTAB 1: PRINT CHR$ (7):
VTAB 23: HTAB 1: INVERSE : PRINT
"SORRY, THERE WAS AN ERROR !
"
61 1480 NORMAL
B4 1490 FOR K = 1 TO 1000: NEXT
DF 1500 GOTO 280
C9 1510 VTAB 23: HTAB 1: PRINT B2$
AB 1520 CA = 4
65 1530 VTAB 23: HTAB 1: INPUT "READ BOOK
NAME: "; AA$
D5 1540 VTAB 23: HTAB 1: PRINT B2$
B1 1550 VTAB 23: HTAB 1: INPUT "HOW MANY
PAGES (1-20)? "; AB$
#4 1560 AB = VAL (AB$)
27 1570 IF AB < 1 OR AB > 20 THEN HTAB 23
: VTAB 1: PRINT CHR$ (7): GOTO 15
40
A2 1580 VTAB 23: HTAB 1: PRINT B2$: VTAB
23: HTAB 1: INPUT "READ HOW FAST
(0-5)? "; FA$: FA = VAL (FA$)
12 1590 IF FA < 0 OR FA > 5 THEN HTAB 23:
VTAB 1: PRINT CHR$ (7): GOTO 158
0
C1 1600 IF FA = 1 THEN IT = 9000
C3 1610 IF FA = 2 THEN IT = 7000
C5 1620 IF FA = 3 THEN IT = 5000
C7 1630 IF FA = 4 THEN IT = 3000
C9 1640 IF FA = 5 THEN IT = 1000
20 1650 FOR KT = 1 TO AB
AB 1652 REM STORE THE GAPS BEFORE LOADING
SCREEN
3C 1654 J = - 7: RESTORE
E6 1655 READ A: J = J + 8: IF A = 1064 THE
N GOTO 1660
1B 1656 FOR I = 0 TO 7: ST(J + I) = PEEK (
A + 120 + I): NEXT : GOTO 1655
F2 1660 PRINT CHR$ (4); "BLOAD "AA$". "KT",
A$400"
48 1662 REM PUT THE VALUES BACK IN THE GA
PS
38 1663 J = - 7: RESTORE
8E 1664 READ A: J = J + 8: IF A = 1064 THE
N RESTORE : GOTO 1670
BA 1665 FOR I = 0 TO 7: POKE A + 120 + I,
ST(J + I): NEXT : GOTO 1664
DE 1670 KT$ = STR$ (KT)
9F 1680 BO$ = "BOOK: " + AA$ + " PAGE:
" + KT$
37 1690 VTAB 23: HTAB 3: INVERSE : PRINT
BO$: NORMAL
89 1700 IF FA = 0 THEN IT = 2: GET Z$
59 1710 FOR TI = 1 TO IT: NEXT TI
18 1720 PRINT CHR$ (13)
29 1730 CALL - 936
35 1740 NEXT KT
C3 1750 CA = 0: GOTO 280
C5 1760 AA$ = ""
58 1770 GET Z1$
EA 1780 IF ASC (Z1$) = 13 THEN GOTO 2080
AB 1790 CT = CT + 1
63 1800 IF ASC (Z1$) = 27 THEN AA$ = "QUI
T": GOTO 2080
10 1810 IF CT = 1 AND ASC (Z1$) = 46 THEN
CT = 0: GOTO 1870
73 1820 IF ASC (Z1$) = 46 THEN GOTO 1970
13 1830 IF ASC (Z1$) = 127 THEN GOTO 1900
08 1840 IF ASC (Z1$) > 64 AND ASC (Z1$) <
91 THEN GOTO 2000
20 1850 IF ASC (Z1$) > 47 AND ASC (Z1$) <
58 THEN GOTO 2000
94 1860 IF ASC (Z1$) > 96 AND ASC (Z1$) <
123 THEN GOTO 1950
D6 1870 HTAB 23: VTAB 17: PRINT CHR$ (7)
5E 1880 VTAB 23: HTAB 17: PRINT AA$
AB 1890 GOTO 1770
58 1900 LN = LEN (AA$): LN = LN - 1: IF LN
< 1 THEN AA$ = "": CT = 1: PC = 0:
GOTO 1930
B1 1910 IF ASC ( RIGHT$ (AA$,1)) = 46 THE
N PC = 0
DE 1920 AA$ = LEFT$ (AA$,LN)
54 1930 VTAB 23: HTAB 17: PRINT "
"
C7 1940 VTAB 23: HTAB 17: PRINT AA$: GOTO
1770
57 1950 Z1$ = CHR$ ( ASC (Z1$) - 32)
75 1960 GOTO 2000
C8 1970 PC = PC + 1
77 1980 IF PC > 1 THEN GOTO 1870
0E 1990 IF AA$ = "" THEN PC = 0: GOTO 187
0
FA 2000 AA$ = AA$ + Z1$
21 2010 IF LEN (AA$) > 1 THEN GOTO 2050
E1 2020 FL = ASC (AA$)
57 2030 IF FL > 64 AND FL < 91 THEN GOTO
2050
29 2040 AA$ = "": GOTO 1870
34 2050 IF LEN (AA$) > 22 THEN AA$ = LEFT
$ (AA$,22): VTAB 23: HTAB 1: PRIN
T CHR$ (7)
57 2060 VTAB 23: HTAB 17: PRINT "
": VTAB 23: HTAB 17
: PRINT AA$: GOTO 1770
DC 2070 IF AA$ = "" THEN AA$ = "QUIT"
7F 2080 CT = 0: PC = 0
58 2090 VTAB 23: HTAB 17: PRINT "
"
31 2100 VTAB 23: HTAB 17: PRINT AA$
D8 2110 RETURN
3C 2120 DL$ = " "
92 2130 KX = KX - 1
D5 2140 IF KX > 1 THEN 2190
4D 2150 KX = 39
BF 2160 KY = KY - 1
62 2170 IF KY > 1 THEN 2190
F0 2180 KY = 21
64 2190 VTAB KY: HTAB KX: PRINT DL$;

```

```

D6 2200 RETURN
C4 2210 VTAB 23: HTAB 1: PRINT B2$
B6 2220 VTAB 23: HTAB 1: PRINT CHR$ (7)
BC 2230 VTAB 23: HTAB 1: PRINT "CATALOG W
    ILL WIPE SCREEN! CONTINUE Y/N"
C9 2240 GET CC$
7E 2250 IF CC$ = "N" OR CC$ = "n" THEN VT
    AB 23: HTAB 1: PRINT B1$: GOTO 53
    0
B4 2260 IF CC$ = "Y" OR CC$ = "y" THEN GO
    TO 2280
74 2270 GOTO 2210
7E 2280 GOSUB 2340

```

```

F1 2290 PRINT : PRINT CHR$ (4); "CATALOG":
    REM PRODOS USE CAT
B8 2300 PRINT : PRINT "PRESS ANY KEY TO R
    ETURN"
BF 2310 GET CC$
B8 2320 GOSUB 2340
D9 2330 GOTO 300
CD 2340 FOR W = 1 TO 40
DF 2350 POKE 33,W
B8 2360 HOME :X = PEEK (Z) + PEEK (Z) + P
    EEK (Z) + PEEK (Z)
4E 2370 NEXT : RETURN

```

### Program 3: The Story Machine Menu

```

4A 10 HOME
#F 20 HTAB 4: VTAB 4: PRINT "Ct1
    -C.....Catalog"
A4 30 HTAB 4: VTAB 6: PRINT "Ct1
    -W.....Clear Screen"
BC 40 HTAB 4: VTAB 8: PRINT "Esc
    .....Print Screen"
57 50 HTAB 4: VTAB 10: PRINT "Ct
    1-T.....Go to Top of Pag
    e"
36 60 HTAB 4: VTAB 12: PRINT "Ct
    1-B.....Change the Borde
    r"
AE 70 HTAB 4: VTAB 14: PRINT "Ct
    1-R.....Read a Book"
5B 80 HTAB 4: VTAB 16: PRINT "Ct
    1-S.....Save Screen to F
    ile"
3F 90 HTAB 4: VTAB 18: PRINT "Ct
    1-L.....Load File to Scr
    een"
73 100 HTAB 4: VTAB 20: PRINT "C
    t1-D.....Delete a File"
A2 110 HTAB 4: VTAB 22: PRINT "C
    t1-E.....Show or Remove
    Menu"
41 120 PRINT CHR$ (4); "BSAVE STO
    RY.MENU,A$400,L$400"

```

aa

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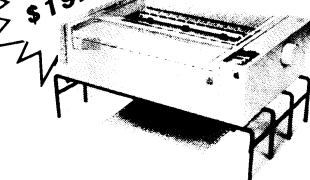
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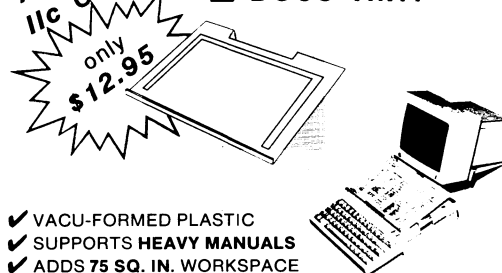
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## Apple Applications Disk

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Formatted on one side for DOS 3.3, on the other for ProDOS, the *Apple Applications Disk* costs \$12.95, plus \$2.00 shipping and handling, and can only be purchased through **COMPUTE!** Publications. See page 16 for details.

# Hi-Res Poster Printer

Mark Russinovich

*Print poster-sized hi-res drawings for banners, signs, and business presentations with this handy utility. Two sizes and a simple-to-use menu make it a snap. Works on Apple II+ and IIe computers in DOS 3.3 and ProDOS. Requires Epson-compatible printer with parallel interface connected to slot 1.*

"Hi-Res Poster Printer" lets you print any Apple hi-res screen in sizes large enough to display as a banner on a wall, as charts large enough to be seen from across the room, or for any other purpose you can think of. The print dump routine can be easily accessed from immediate mode or from within other Applesoft programs, making it easy to add to your own BASIC creations.

## Getting Ready To Print

You must first type in Program 1, "Poster Dump," using the "Apple MLX" error-checking utility found elsewhere in this issue.

Before running MLX, type

**HIMEM: 35840**

Load and run Apple MLX and respond to the two prompts asking for the program's starting and ending addresses with

**Starting Address: 9000**

**Ending Address: 9255**

Enter Program 1's listing as it appears at the end of this article. When you're finished and ready to save a copy to disk, name it POSTER.DUMP (if you don't, you'll have to modify Program 2 later).

## Immediate Printing

If you want to use the program in the immediate mode (not as part of another program), type **BRUN POSTER.DUMP**

The program loads into memory, resets HIMEM to protect itself from Applesoft, and sets the ampersand vector to point to the beginning of the routine. Whenever you want to print out a poster, BLOAD the picture into hi-res page 1 or 2, turn on the printer, position the printhead at the top of a page, and type the command

**&P,S**

where *P* is the hi-res page number (1 or 2) and *S* is the poster size (1 or 2). If values other than 1 or 2 are entered, the message ?SYNTAX ERROR appears.

To use the routine from within an Applesoft BASIC program, use the following statement as the first line of your program:

```
10 PRINT CHR$(4);"BRUN POSTER.DUMP"
```

At some point in the program, prompt the user for the desired poster size; then access POSTER.DUMP with a line like

```
100 &P,S
```

Again, *P* is the hi-res page number and *S* is the poster size. Of course, those variables must have been assigned earlier when the user responded to your program's questions regarding page and size.

Before a line like the one above executes, have your program check to see whether *P* and *S* are within the valid range, or a syntax error will appear and the program will stop. It would



be a good idea to tell the user to turn on the printer and have your program display a friendly message like *PRINTING POSTER. PLEASE WAIT.*

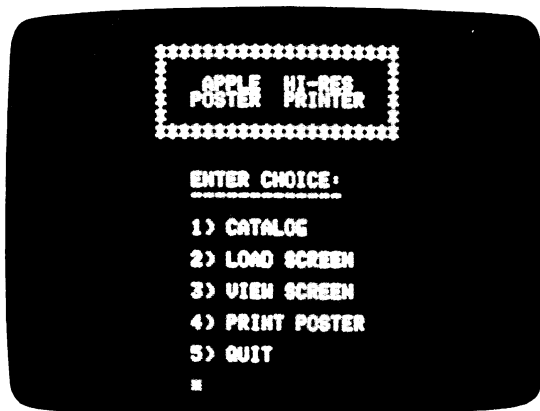
## Printing From The Menu

If you already have hi-res pictures on disk (perhaps created with commercial software or even with "Power Sketch," the hi-res sketch program in this issue) and you want to print them as posters, type in Program 2, "Poster.Loader." It's a BASIC program, so be sure to use the "Apple Automatic Proofreader" to enter it.

Make sure that both Programs 1 and 2 are on the same disk. If you named Program 1 something different from POSTER.DUMP, you'll have to change the BRUN statement in line 30 to reflect your chosen filename.

The menu in Figure 1 appears and lets you easily catalog disks, load hi-res pictures, and view them. Once you've decided which picture you want to print as a poster, select the fourth function. You'll then be asked for the size of the poster.

Figure 1: The Poster Print Menu



This simple menu lets you view the files on disk, load a hi-res picture into memory, view it, and print it in one of two poster sizes.

## Putting The Poster Together

POSTER.DUMP produces posters by printing sections of them on consecutive pieces of paper. The size 1 poster is two sheets by two sheets and prints in the order you see in Figure 2. The shaded areas are the portions which are part of actual screen material; the dotted lines indicate the suggested places to cut with scissors. You should use a ruler and a pencil to draw a line at these locations to increase cutting accuracy. Once the cutting is done, tape the pieces following the arrangement in the figure. Use the tape sparingly on the front of the poster so that it doesn't glare in the light.

Figure 2: The Size 1 Poster

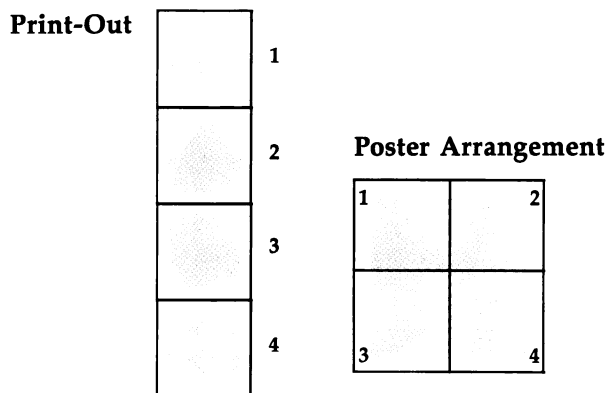
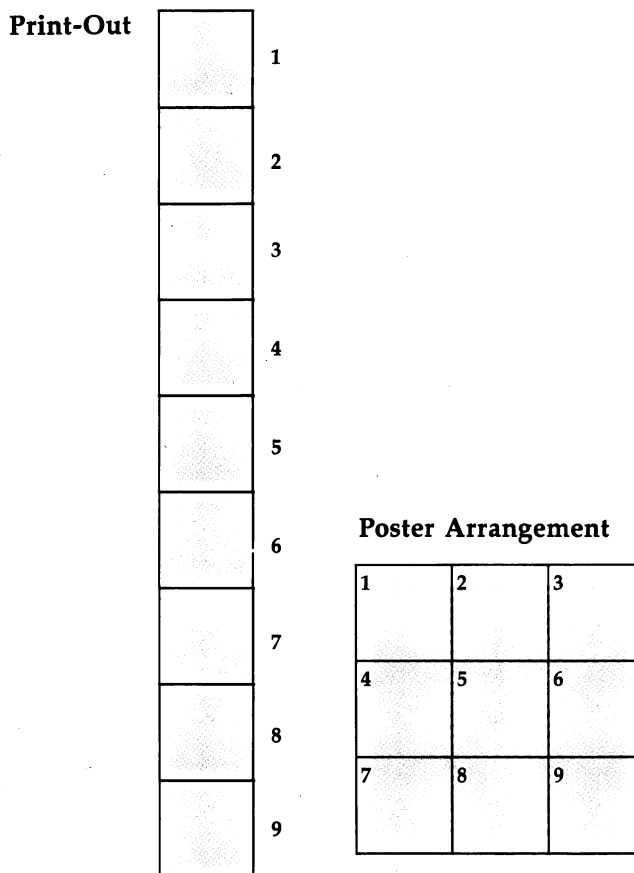


Figure 3: The Size 2 Poster



The size 1 poster takes around 20 minutes to print, while the larger poster takes about 30 minutes.

The size 2 poster is a little more difficult to put together. It's about three sheets by three sheets, but because of a quirk in the Epson printer interface, there's an overlap of seven pixels in the third column of the poster sections. You can either measure the width of seven pixels (0.56 inches) and draw a line that distance from the left edge of the third column, or you can compare the second and third columns to see where the overlap ends. The suggested cutting and proper arrangement patterns of the size 2 poster are shown in Figure 3.

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## Program 1: POSTER.DUMP

For mistake-proof program entry, use "Apple MLX," found elsewhere in the issue, to type in this program.

```
9000: A9 4C 8D F5 03 A9 18 8D 96
9008: F6 03 A9 90 8D F7 03 A9 9F
9010: FF 85 73 A9 8F 85 74 60 77
9018: 20 CF 91 20 F8 E6 E0 01 97
9020: F0 07 E0 02 F0 0A 20 C9 71
9028: DE A9 20 85 E6 4C 34 90 E0
9030: A9 40 85 E6 20 BE DE 20 2F
9038: F8 E6 E0 01 90 0B E0 03 31
9040: B0 07 CA 8E 57 92 4C 4C A7
9048: 90 20 C9 DE A0 00 84 EE DD
9050: AD 57 92 C9 01 D0 04 A9 0A
9058: 04 85 EE 84 FD 04 FE 84 87
9060: FF 8C 56 92 84 FA A4 EE E0
9068: C0 04 B0 08 A2 00 8E 5D 11
9070: 92 4C 8D 90 C0 06 F0 08 B0
9078: C0 09 F0 04 C0 0C D0 08 7A
9080: A2 02 8E 5D 92 4C 8D 90 8C
9088: A2 01 8E 5D 92 B9 13 92 17
9090: 85 FB B9 06 92 85 F9 B9 63
9098: F9 91 85 EF AC 5D 92 A9 74
90A0: 1B 20 DA 91 A9 33 20 DA 01
90A8: 91 B9 E3 91 20 DA 91 B9 DF
90B0: E6 91 8D 58 92 B9 E9 91 C1
90B8: 8D 59 92 B9 EC 91 8D 5A 08
90C0: 92 AA CA 8E 5B 92 B9 EF A0
90C8: 91 8D 5C 92 98 0A A8 B9 C2
90D0: 47 92 85 06 B9 48 92 85 E4
90D8: 07 A0 00 B1 06 99 5E 92 A6
90E0: C8 C0 03 D0 F6 A9 0A 20 96
90E8: DA 91 A0 05 A9 20 DA 29
90F0: 91 88 D0 FA A9 1B 20 DA 9B
90F8: 91 B9 5E 92 20 DA 91 C8 9E
9100: C0 03 D0 F5 A5 FB 85 FC E2
9108: A5 FC A4 EE D9 3A 92 B0 4E
9110: 28 A6 F9 A4 FA 20 11 F4 E9
9118: A4 EF B1 26 A4 FF 39 F2 AC
9120: 91 F0 16 AD 5C 92 A4 FD 5A
9128: F0 0B AE 58 92 4A CA D0 06
9130: FC 88 4C 28 91 05 FE 85 24
9138: FE E6 FC E6 FD A5 FD CD F2
9140: 5A 92 D0 C4 A5 FE AC 59 77
9148: 92 AE C1 C1 30 FB 8D 90 D1
9150: C0 88 D0 F5 A9 00 85 FE C6
9158: 85 FD E6 FF A5 FF C9 07 62
9160: D0 06 E6 EF A9 00 85 FF A1
9168: E6 F9 D0 02 E6 FA A4 EE 13
9170: A5 F9 D9 20 92 D0 8D A5 BA
9178: FA D9 2D 92 D0 86 B9 F9 6C
9180: 91 85 EF B9 06 92 85 F9 E6
9188: A9 00 85 FA AD 57 92 C9 9A
9190: 00 F0 12 EE 56 92 AD 56 CF
9198: 92 C9 01 D0 03 4C E5 90 4A
91A0: A9 00 8D 56 92 A5 FB 38 0B
91A8: 6D 5B 92 85 FB D9 3A 92 52
91B0: B0 03 4C E5 90 E6 EE A5 78
91B8: EE C9 04 F0 0E C9 0D F0 F7
91C0: 0A A9 0C 20 DA 91 A0 00 35
91C8: 4C 5B 90 20 CF 91 60 A9 2C
91D0: 1B 20 DA 91 A9 40 20 DA 67
91D8: 91 60 AE C1 C1 30 FB 8D 23
91E0: 90 C0 60 15 0F 0F 07 05 A1
91E8: 05 06 09 09 01 01 01 7F 4F
91F0: 7C 7C 01 02 04 08 10 20 32
91F8: 40 00 14 00 14 00 0E 1B 96
9200: 00 0E 1B 00 0E 1B 00 8C 75
9208: 00 8C 00 62 BD 00 62 BD E6
9210: 00 62 BD 00 00 60 60 00 C7
```

```
9218: 00 00 40 40 40 80 80 80 CE
9220: 8C 18 8C 18 62 C4 18 62 5D
9228: C4 18 62 C4 18 00 01 00 11
9230: 01 00 00 01 00 00 01 00 E7
9238: 00 01 60 60 C0 C0 40 40 79
9240: 40 80 80 80 C0 C0 C0 4D 95
9248: 92 50 92 53 92 4C 48 03 AB
9250: 4C 72 03 4C 33 03 00 00 03
```

## Program 2: Poster.Loader

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
01 10 ONERR GOTO 40
52 20 D$ = CHR$ (4)
FC 30 PRINT D$"BRUN POSTER.DUMP"
55 40 TEXT : HOME
70 50 HTAB 9: PRINT "*****"
    *": HTAB 9: PRINT "*"
    *": HTAB 9: PRINT "*" APPLE H
    I-RES *": HTAB 9: PRINT "*" POSTE
    R PRINTER *": HTAB 9: PRINT "*"
    *": HTAB 9: PRINT "*"
    *****"
A0 60 PRINT : PRINT : HTAB 12: PRINT "ENT
ER CHOICE:": HTAB 12: PRINT "-----
-----": PRINT : HTAB 12: PRINT "1
) CATALOG": PRINT : HTAB 12: PRINT
"2) LOAD SCREEN"
FC 70 PRINT : HTAB 12: PRINT "3) VIEW SCR
EEN": PRINT : HTAB 12: PRINT "4) PR
INT POSTER": PRINT : HTAB 12: PRINT
"5) QUIT"
D7 80 VTAB 22: HTAB 12: GET A$: IF A$ = "
1" THEN 140
2A 90 IF A$ = "2" THEN 160
F6 100 IF A$ = "3" THEN 170
74 110 IF A$ = "4" THEN 200
48 120 IF A$ = "5" THEN END
D0 130 PRINT CHR$ (7): GOTO 80
60 140 PRINT : HOME : PRINT D$"CATALOG"
E3 150 PRINT : PRINT "PRESS ANY KEY:": G
ET A$: GOTO 40
D0 160 PRINT : VTAB 22: INPUT "ENTER FILE
NAME: ";FL$: PRINT D$"BLOAD"FL$,
A$2000": HOME : GOTO 40
81 170 POKE - 16302,0: POKE - 16297,0: PO
KE - 16304,0: POKE - 16368,0
87 180 X = PEEK ( - 16384): IF X < 128 TH
EN 180
2B 190 POKE - 16368,0: TEXT : HOME : GOTO
40
8D 200 PRINT : VTAB 22: INPUT "ENTER SIZE
OF POSTER (1 OR 2): ";S: IF S < >
1 AND S < > 2 THEN 200
4F 210 POKE - 16302,0: POKE - 16297,0: PO
KE - 16304,0: & 1,S: TEXT : HOME :
GOTO 40
```

aa



# Solarpix

Simon Edgeworth

Apple Version by Tim Victor, Editorial Programmer

Planets move in graceful orbits, comets hurtle toward the sun, and the moon turns in its eons-old patterns. This impressive series of astronomical simulations for the Apple II+, IIe, and IIfx shows all this, and more. Works in DOS 3.3 or ProDOS.

Whether you're new to stargazing or a veteran astronomer, this easy-to-use demonstration of the planets and comets is fun to watch. "Solarpix" is a four-module simulation which includes:

- **Sun and Planets**, simulating the movement of the planets around the sun
- **Sun, Earth, and Moon**, showing how the phases of the moon are created by its orbit
- **Comets**, illustrating the path of Halley's and other comets
- **Facts**, listing the key properties of each planet, the sun, and the moon

Solarpix consists of two program listings—a main program written in BASIC, and a binary file containing shape data, character data, a character generator, and a sprite emulator.

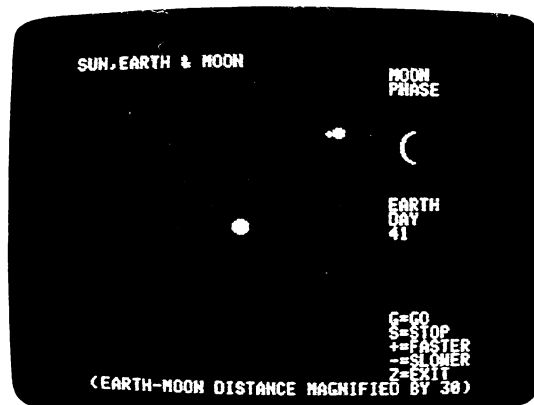
Type in Program 1, Solarpix, using the "Apple Automatic Proofreader," found elsewhere in this issue, and save a copy to disk. Program 2 must be entered using "Apple MLX," another error-checking utility included in this issue. (You must have a copy of Apple MLX on disk before typing in Program 2.)

Load and run Apple MLX and respond with these addresses:

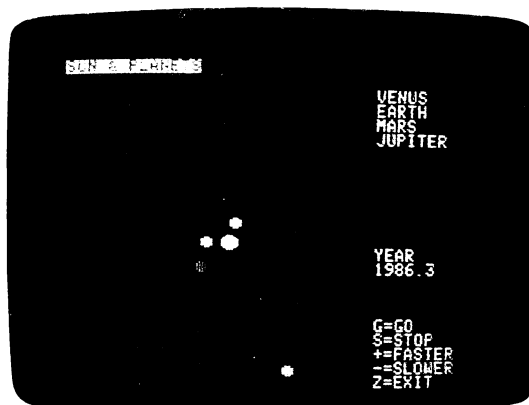
Starting Address: 8100  
Ending Address: 88D7

After you're finished typing in Program 2, save it to the same disk you used for Program 1. *For Solarpix to work properly, make sure you name this binary file SOLARPIX.BIN.*

Press down the Caps Lock key before running Solarpix.



Another "Solarpix" module shows the sun, earth, and moon. The orbit of the earth around the sun and of the moon around the earth are shown, as well as the phases of the moon as seen from earth.



One of four modules in "Solarpix," Sun and Planets simulates the orbits of up to four of the solar system's nine planets. Here Venus, Earth, Mars, and Jupiter are portrayed in their early 1986 positions.

## Copernican Motions

In the first module, Sun and Planets, you can watch the orbits of up to four planets at once. The sun is stationary at the center of the screen. Select the innermost and outermost planets you'd like to see, and a year from 1 to 2000. Once the screen is set up, press G to put the planets in motion, the plus key (+) to increase the speed, the minus key (−) to reduce the speed, and S to stop. Elapsed time is displayed in years on the right side of the screen. When you're through, exit the module (and all others) by pressing the Z key.

## Lunar Lore

The second module, Sun, Earth, and Moon, shows how the moon's orbit around the earth causes its different phases. The earth is shown orbiting the sun, while the moon orbits the earth. The distance between the earth and the moon has been magnified by 30 times to make

it visible. You'll see the current appearance of the moon in the top right corner of the screen. Elapsed time in days is displayed to the right. You can control the motion by using the G, S, +, and - keys as you did in the first module.

The moon takes 27.3 days to orbit the earth. However, it's 29.6 days from one full moon to the next. If you watch the display carefully, you can see why this happens—the moon actually has to complete slightly more than one orbit around the earth to reach the same position relative to the sun.

Because the moon's orbit is slightly tilted, the moon, earth, and sun are normally never exactly aligned. On the rare occasions when they are, an eclipse occurs. If this happens at full moon, we see a lunar eclipse. If it happens at new moon, we see a solar eclipse.

## Dirty Ice

The third module, Comets, shows the orbits of these dirty snowballs. Planets and comets move in elliptical orbits, which look like flattened circles. The extent to which the circle is flattened is called its eccentricity, and ranges from zero (circular) up to almost one. The eccentricities of the major planets vary widely—Venus's is almost zero, for instance, while Pluto's is approximately 0.25. A moving body—say, a comet—with an eccentricity of one or more would leave the solar system.

Enter a value between zero and .96 and press Return to set a comet (real or imaginary) into motion. Notice that the speed of a comet varies as it moves around its orbit. It moves slowest when it's farthest from the sun, and fastest when it's closest to the sun. This is true of planets too, but it's far easier to see in comets' orbits.

Try entering these eccentricities—they represent actual comets.

Faye .56  
Finlay .70  
Enke .85  
Halley's .96R

(The R in Halley's stands for reverse, because the comet orbits in the opposite direction of the planets.)

To exit this module, you have to hit Return after you've pressed the Z key.

## Facts And Figures

The last module in Solarpix provides some interesting facts about the solar system. From the menu you can select a planet, the sun, or the moon, then view all the facts about it; or you can select a characteristic, such as mass or tem-

perature, and compare the values for the nine planets plus the sun and the moon. Because the distances from the planets to the sun are so hard to visualize, another item, "Drive Time," has been added. It shows the amount of time it would take to drive from a given planet to the sun while traveling at 55 miles per hour. For the moon, the drive time is given for travel from the moon to the earth.

Masses are given in units equivalent to the weight of the earth because the values in tons are too large to comprehend (the earth weighs about 6,588,000,000,000,000,000 tons). Densities are compared with water (notice that Saturn is *less* dense than water). Temperatures are average surface temperatures. Moons are listed in order of distance from their planet, starting with the closest. Moons listed as X have not yet been named.

For the amateur astronomer, here are a few technical details. In Solarpix, all orbits are assumed to be on the same plane. For Pluto, however, true elliptical motion is simulated. The planet screen is oriented with Pluto's aphelion on the right, and the positions of the planets are calculated from their actual positions on October 27, 1984. All the graphics screens show views from ecliptic north.

## Program 1: Solarpix

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
CE 5 HOME : VTAB 10: HTAB 15: PRINT "PLEASE WAIT"
74 8 LOMEM: 24576: HIMEM: 31744
78 10 PRINT CHR$(4); "BLOAD SOLARPIX.BIN, A$B100"
20 30 POKE 6,240: POKE 7,131: POKE 230,32 : IF PEEK (190 * 256) = 76 THEN PRINT CHR$(4); "PR#A$85C8": GOTO 40
F8 35 POKE 54,200: POKE 55,133: CALL 1002
54 40 DIM S(255),C(255),M$(9,17),SH(11),SL(11)
6A 42 PU = 32768:CO = 34336
51 44 FOR I = 0 TO 10: POKE PU + I * 6 + 5,129: READ A: POKE PU + I * 6 + 4, A: NEXT
68 46 FOR I = 0 TO 11:AD = 33103 + 56 * I :SH(I) = INT (AD / 256):SL(I) = AD - 256 * SH(I): NEXT
64 50 EY = 1984.82
58 60 PP = 8 * ATN (1):P$(0) = "AC":P$(1) = "DE":SA = 1.15
87 80 SP$ = CHR$(32):X$ = SP$ + "Z=EXIT"
29 100 T$(1) = "SUN & PLANETS"
DE 110 T$(2) = "SUN,EARTH & MOON"
89 120 T$(3) = "COMETS"
20 130 T$(4) = "FACTS"
F9 200 FOR J = 0 TO 10: READ F$(J),U$(J)
15 210 L = 0:H = 10: IF J > 4 THEN L = 1: H = 9
92 220 FOR K = L TO H: READ Z(K,J): NEXT : NEXT
92 230 FOR J = 1 TO 9:D(J) = Z(J,5)
DE 240 P(J) = Z(J,6): NEXT
18 250 FOR J = 0 TO 10: READ N$(J)
```

```

08 260 IF J < 4 OR J = 10 THEN 280
29 270 FOR K = 1 TO Z(J,10): READ M$(J,K)
: NEXT
CC 280 NEXT : FOR J = 1 TO 9: READ R:R(J)
= R / 360: NEXT
AD 290 FOR N = 0 TO 255:M = N * PP / 256
38 300 S(N) = SIN (M):C(N) = COS (M): NEX
T
54 360 GOSUB 550
AC 390 HOME : VTAB 5: HTAB 15: PRINT "SOL
ARPIX"
CF 400 VTAB 15: FOR J = 1 TO 4: HTAB 9: P
RINT J" "T$(J): PRINT
CC 410 NEXT : PRINT TAB( 9)"Q QUIT"
6F 420 GOSUB 470: ON K GOTO 630,1010,1280
,1460
17 430 IF K$ < > "Q" THEN 420
53 450 GOSUB 550
DD 460 TEXT : HOME : END
86 470 VTAB 24: GET K$:K = VAL (K$): RETU
RN
7E 500 VTAB 19: HTAB 31: PRINT "G=GO"
C1 510 PRINT TAB( 31)"S=STOP"
64 520 PRINT TAB( 31)"+=FASTER"
15 530 PRINT TAB( 31)"-=SLOWER"
75 540 PRINT TAB( 30)X$: RETURN
DA 550 FOR I = 0 TO 15: POKE PU + I * 6,0
: NEXT : CALL CO + 3: RETURN
61 570 VTAB 23: HTAB 31: PRINT X$
23 580 VTAB 3: HTAB 1: RETURN
E2 590 K = PEEK (49152): IF K < 128 THEN
RETURN
EF 595 POKE 49168,0:K$ = CHR$ (K - 128):
IF K$ = "S" THEN FL = 1
E1 600 IF K$ = "G" THEN FL = 0
D5 610 IF K$ = "-" THEN M = M / 2
1A 620 RETURN
31 630 HOME : GOSUB 550: PRINT T$(1): GOS
UB 570
97 650 PRINT "PLEASE SELECT PLANETS (MAX4
)"
FF 660 PRINT : FOR J = 1 TO 9: PRINT J" "
N$(J): NEXT
2A 670 VTAB 15: PRINT "INNER PLANET?";
4C 680 GET K$: IF K$ = "Z" THEN 360
AB 690 L = VAL (K$): IF L < 1 THEN 680
C1 700 PRINT N$(L): PRINT "OUTER PLANET?"
;
3F 710 GET K$: IF K$ = "Z" THEN 360
0E 720 H = VAL (K$): IF H < L OR H > 9 OR
H - L > 3 THEN 710
38 730 PRINT N$(H): PRINT
A5 750 FOR J = L TO H:F(J) = D(J) * 80 /
D(H)
46 760 E(J) = F(J) * SA: NEXT :M = P(L) /
50:ML = M * 9
57 770 INPUT "STARTING YEAR (1-2000)";K$
A9 780 SY = VAL (K$): IF SY < 1 OR SY > 2
000 THEN 630
4C 790 HOME : HGR2 : INVERSE : PRINT T$(1
): NORMAL :K = 1
25 800 VTAB 3: FOR J = L TO H
7C 810 PRINT TAB( 31)N$(J): NEXT
80 830 GOSUB 500: VTAB 14: HTAB 31: PRINT
"YEAR"
04 835 A$ = "2000<4000.5FFFM": GOSUB 1780
7C 840 E = .25:T = SY - EY:FL = 1
88 850 POKE PU,1: POKE PU + 1,0: POKE PU
+ 2,106: POKE PU + 3,98
CB 855 FOR I = L TO H: POKE PU + 6 * I +
6,1: POKE PU + 6 * I + 7,0: NEXT
43 860 FOR J = L TO H:A = T / P(J) + R(J)

```

```

98 870 A = INT ((A - INT (A)) * 256): IF
J = 9 THEN 890
FC 880 X(J) = C(A):Y(J) = - S(A): GOTO 91
0
10 890 Z = 1 + E * C(A):X(J) = E + (E + C
(A)) / Z
87 900 Y(J) = (E * E - 1) * S(A) / Z
AC 910 X(J) = 2 * INT ((110 + X(J) * E(J)
) / 2)
7C 920 Y(J) = INT (99 + Y(J) * F(J)): NEX
T
0D 930 FOR J = 1 TO 9: POKE PU + 6 * J +
8,X(J)
AE 940 POKE PU + 6 * J + 9,Y(J): NEXT : C
ALL CO
89 950 T$ = STR$ ( INT ((T + EY) * 10) /
10)
71 960 FOR I = 0 TO 1: VTAB 15: HTAB 31:
PRINT T$" " : POKE 230,96 - PEEK (
230): NEXT
86 970 GOSUB 590: IF K$ = "Z" THEN TEXT :
GOTO 630
0E 980 IF FL THEN 970
8D 990 IF K$ = "+" AND M < ML THEN M = M
* 2
CD 1000 T = T + M: GOTO 860
C6 1010 HGR2 : HOME : PRINT T$(2): PRINT
TAB( 31)"MOON"
C4 1030 PRINT TAB( 31)"PHASE": GOSUB 500
62 1040 VTAB 24: HTAB 2: PRINT "(EARTH-MO
ON DISTANCE MAGNIFIED BY 30)";
89 1050 VTAB 11: HTAB 31: PRINT "EARTH"
BE 1060 PRINT TAB( 31)"DAY"
B5 1065 A$ = "2000<4000.5FFFM": GOSUB 178
0
36 1070 E = 80:D = E * SA:F = D / 13:G =
E / 13
A9 1080 M = 0.3 / 365.25:T = 0:H = 13.368
5
6F 1090 POKE PU,1: POKE PU + 6,1: POKE PU
+ 7,0: POKE PU + 24,1: POKE PU +
25,0: POKE PU + 66,1
D5 1100 POKE PU + 1,0: POKE PU + 2,104: P
OKE PU + 3,92
BA 1110 POKE PU + 67,0: POKE PU + 68,218:
POKE PU + 69,43
B3 1120 FL = 1
79 1130 A = T - INT (T):B = T * H:B = B -
INT (B)
12 1140 C = INT (12 * (B - A) + .5 - 7)
4D 1150 IF C < 0 THEN C = C + 12: GOTO 11
50
9A 1160 A = A * PP:B = B * PP
A2 1170 X = 2 * INT ((104 + COS (A) * D)
/ 2)
40 1180 Y = INT (93 - SIN (A) * E)
7C 1190 W = INT (X + 4 + COS (B) * F)
CA 1200 Z = INT (Y + 2 - SIN (B) * G)
51 1210 POKE PU + 26,X: POKE PU + 27,Y: F
OKE PU + 8,W
F4 1220 POKE PU + 9,Z: POKE PU + 70,SL(C)
: POKE PU + 71,SH(C): CALL CO
AD 1230 FOR I = 0 TO 1: VTAB 13: HTAB 31:
PRINT INT (T * 365.25): POKE 230
,96 - PEEK (230): NEXT
11 1240 GOSUB 590: IF K$ = "Z" THEN TEXT
: GOTO 360
EB 1250 IF FL THEN 1240
55 1260 IF K$ = "+" AND M < .006 THEN M =
M * 2
0E 1270 T = T + M: GOTO 1130
01 1280 GOSUB 550: HOME : INVERSE : PRINT
T$(3): NORMAL : GOSUB 570

```



```

F8 1300 INPUT "ECCENTRICITY(0-0.96)";K$
F9 1310 E = VAL (K$): IF K$ = "Z" THEN 36
0
69 1320 IF E < 0 OR E > .96 OR LEN (K$) =
0 THEN 1280
E4 1330 FL = 1: IF RIGHT$ (K$,1) = "R" TH
EN FL = - 1
2F 1340 HOME : HGR2 : INVERSE : PRINT T$(
3): NORMAL : GOSUB 570
F3 1350 PRINT "ECCENTRICITY="E: VTAB 3: H
TAB 28
63 1360 IF E THEN PRINT "ACCELERATING"
88 1365 A$ = "2000<4000.5FFFFM": GOSUB 178
0
F8 1370 M = 0.01:T = 0:F = 65 * SA:G = 65
* FL
47 1380 POKE PU,1: POKE PU + 6,1: POKE PU
+ 1,0: POKE PU + 7,0
71 1385 POKE PU + 2,76: POKE PU + 3,98
C2 1390 A = (T - INT (T)) * PP:Z = 1 + E
* COS (A)
94 1400 X = E + (E + COS (A)) / Z:Y = (E
* E - 1) * SIN (A) / Z
86 1410 X = INT (76 + X * F):Y = INT (100
+ Y * G)
82 1420 J = INT (2 * A / PP): POKE PU + 8
,X: POKE PU + 9,Y: CALL C0
21 1430 IF E > 0.1 THEN FOR I = 1 TO 2: V
TAB 3: HTAB 28: PRINT P$(J): POKE
230,96 - PEEK (230): NEXT
87 1440 K = PEEK (49152): IF K = ASC ("Z"
) + 128 THEN POKE 49168,0: TEXT :
GOTO 1280
11 1450 T = T + M: GOTO 1390

```

## Program 2: Solarpix.Bin

For mistake-proof program entry, use "Apple MLX," found elsewhere in the issue, to type in this program.

```

8100: 02 08 F8 81 FE 87 FF 8F E2
8108: FF 8F FF 8F FF 8F FE 87 AB
8110: F8 81 01 03 06 0F 06 02 BA
8118: 06 94 80 D5 80 D5 80 D5 E2
8120: 80 D5 80 94 80 02 06 A8 F2
8128: 80 AA 81 AA 81 AA 81 AA 55
8130: 81 A8 80 02 06 14 00 55 24
8138: 00 55 00 55 00 55 00 14 4F
8140: 00 02 06 28 00 2A 01 2A DB
8148: 01 2A 01 2A 01 28 00 03 C4
8150: 12 80 B8 80 80 C0 81 80 26
8158: 80 86 80 80 8C 80 80 98 55
8160: 80 80 98 80 80 80 80 80 27
8168: 80 80 80 80 80 80 80 80 E6
8170: 80 80 80 80 80 80 80 98 19
8178: 80 80 98 80 80 8C 80 80 AE
8180: 86 80 C0 81 80 B8 80 03 02
8188: 12 80 B8 80 80 E0 81 80 DE
8190: E0 87 80 C0 8F 80 C0 9F A1
8198: 80 80 9F 80 80 BF 80 80 7C
81A0: BF 80 80 BF 80 80 BF 80 85
81A8: 80 BF 80 80 BF 80 80 9F 94
81B0: 80 C0 9F 80 C0 8F 80 E0 46
81B8: 87 80 E0 81 80 B8 80 03 BE
81C0: 12 80 B8 80 80 F8 81 80 77
81C8: F8 87 80 F8 8F 80 F8 9F D9
81D0: 80 F8 9F 80 F8 BF 80 F8 0F
81D8: BF 80 F8 BF 80 F8 BF 80 DE
81E0: F8 BF 80 F8 BF 80 F8 9F 81
81E8: 80 F8 9F 80 F8 BF 80 F8 66
81F0: 87 80 F8 81 80 B8 80 03 F9
81F8: 12 80 B8 80 80 FE 81 80 C7
8200: FE 87 80 FF 8F 80 FF 9F 94
8208: C0 FF 9F C0 FF BF C0 FF ED

```

```

8210: BF C0 FF BF C0 FF BF C0 67
8218: FF BF C0 FF BF C0 FF 9F C5
8220: 80 FF 9F 80 FF 8F 80 FE 9F
8228: 87 80 FE 81 80 B8 80 03 F3
8230: 12 80 BC 80 80 FF 81 E0 E5
8238: FF 87 F0 FF 8F F8 FF 9F 3D
8240: F8 FF 9F FC FF BF FC FF 7E
8248: BF FC FF BF FC FF BF FC CC
8250: FF BF FC FF BF F8 FF 9F 66
8258: F8 FF 9F F0 FF 8F E0 FF DC
8260: 87 80 FF 81 80 BC 80 03 5C
8268: 12 80 BF 80 E0 FF 81 F8 99
8270: FF 87 FC FF 8F FE FF 9F 0F
8278: FE FF 9F FF FF BF FF FF EF
8280: BF FF FF BF FF FF BF FF E0
8288: FF BF FF FF BF FE FF 9F 17
8290: FE FF 9F FC FF 8F F8 FF 09
8298: 87 E0 FF 81 80 BF 80 03 B8
82A0: 12 80 8F 80 E0 BF 80 F8 C8
82A8: FF 81 FC FF 83 FE FF 87 4D
82B0: FE FF 87 FF FF 8F FF FF 64
82B8: 8F FF FF 8F FF FF 8F FF 9D
82C0: FF 8F FF FF 8F FE FF 87 A9
82C8: FE FF 87 FC FF 83 F8 FF 0E
82D0: 81 E0 BF 80 80 8F 80 03 15
82D8: 12 80 87 80 E0 9F 80 F8 7F
82E0: 9F 80 FC BF 80 FE BF 80 71
82E8: FE FF 80 FF FF 80 FF FF 7F
82F0: 80 FF FF 80 FF FF 80 FF 3F
82F8: FF 80 FF FF 80 FE FF 80 9E
8300: FE BF 80 FC BF 80 F8 9F E7
8308: 80 E0 9F 80 80 87 80 03 A9
8310: 12 80 87 80 E0 87 80 F8 58
8318: 87 80 FC 87 80 FE 87 80 AA
8320: FE 87 80 FF 87 80 FF 87 5E
8328: 80 FF 87 80 FF 87 80 FF 87
8330: 87 80 FF 87 80 FE 87 80 23
8338: FE 87 80 FC 87 80 F8 87 38
8340: 80 E0 87 80 80 87 80 03 DE
8348: 12 80 87 80 E0 81 80 F8 78
8350: 81 80 FC 80 80 FE 80 80 61
8358: BE 80 80 BF 80 80 BF 80 F0
8360: 80 BF 80 80 BF 80 80 BF 70
8368: 80 80 BF 80 80 BE 80 80 50
8370: FE 80 80 FC 80 80 F8 81 70
8378: 80 E0 81 80 80 87 80 03 56
8380: 12 80 87 80 E0 80 80 98 4C
8388: 80 80 8C 80 80 86 80 80 29
8390: 86 80 80 83 80 80 83 80 D0
8398: 80 83 80 80 83 80 80 83 7B
83A0: 80 80 83 80 80 86 80 80 20
83A8: 86 80 80 8C 80 80 98 80 A3
83B0: 80 E0 80 80 80 87 80 03 6E
83B8: 12 00 00 00 00 00 00 00 C8
83C0: 00 00 00 00 00 00 00 00 C7
83C8: 00 00 00 00 00 00 00 00 CF
83D0: 00 00 00 00 00 00 00 00 D7
83D8: 00 00 00 00 00 00 00 00 DF
83E0: 00 00 00 00 00 00 00 00 E7
83E8: 00 00 00 00 00 00 00 00 EF
83F0: 00 00 00 00 00 00 00 00 F7
83F8: 08 08 08 08 08 08 08 08 D7
8400: 14 14 14 00 00 00 00 00 9A
8408: 14 14 3E 14 3E 14 14 00 93
8410: 08 3C 0A 1C 28 1E 08 00 F8
8418: 06 26 10 08 04 32 30 00 79
8420: 04 0A 0A 04 2A 12 2C 00 21
8428: 08 08 08 00 00 00 00 00 38
8430: 08 04 02 02 02 04 08 00 CE
8438: 08 10 20 20 20 10 08 00 A0
8440: 08 2A 1C 08 1C 2A 08 00 75
8448: 00 08 08 3E 08 08 00 00 98
8450: 00 00 00 00 08 08 04 00 C1

```

```

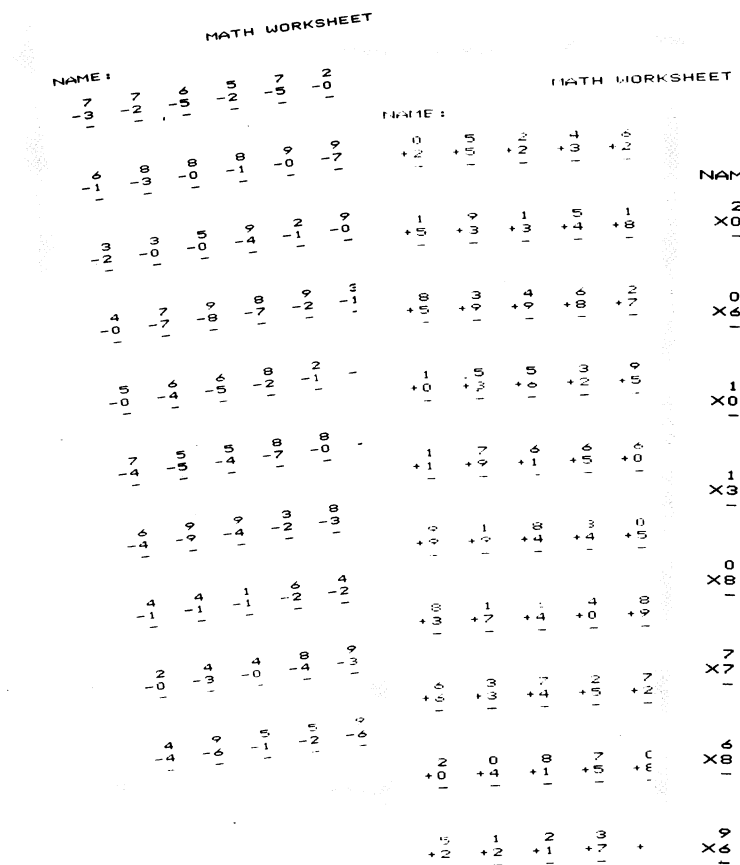
8458: 00 00 00 3E 00 00 00 00 45
8460: 00 00 00 00 00 00 08 00 79
8468: 00 20 10 08 04 02 00 00 24
8470: 1C 22 32 2A 26 22 1C 00 EA
8478: 08 0C 08 08 08 08 1C 00 A2
8480: 1C 22 20 18 04 02 3E 00 4A
8488: 3E 20 10 18 20 22 1C 00 FD
8490: 10 18 14 12 3E 10 10 00 9D
8498: 3E 02 1E 20 20 22 1C 00 C8
84A0: 38 04 02 1E 22 22 1C 00 BA
84A8: 3E 20 10 08 04 04 04 00 93
84B0: 1C 22 22 1C 22 22 1C 00 28
84B8: 1C 22 22 3C 20 10 0E 00 BD
84C0: 00 00 08 00 08 00 00 00 08
84C8: 00 00 08 00 08 08 04 00 38
84D0: 10 08 04 02 04 08 10 00 E4
84D8: 00 00 3E 00 3E 00 00 00 9B
84E0: 04 08 10 20 10 08 04 00 9A
84E8: 1C 22 10 08 08 00 08 00 5B
84F0: 1C 22 2A 3A 1A 02 3C 00 CA
84F8: 08 14 22 22 3E 22 22 00 30
8500: 1E 22 22 1E 22 22 1E 00 9E
8508: 1C 22 02 02 02 22 1C 00 DA
8510: 1E 22 22 22 22 22 1E 00 EE
8518: 3E 02 02 1E 02 02 3E 00 79
8520: 3E 02 02 1E 02 02 02 00 09
8528: 3C 02 02 02 32 22 3C 00 C4
8530: 22 22 22 3E 22 22 22 00 DA
8538: 1C 08 08 08 08 08 1C 00 6D
8540: 20 20 20 20 20 22 1C 00 2B
8548: 22 12 0A 06 0A 12 22 00 67
8550: 02 02 02 02 02 02 3E 00 D1
8558: 22 36 2A 2A 22 22 22 00 C7
8560: 22 22 26 2A 32 22 22 00 CA
8568: 1C 22 22 22 22 22 1C 00 42
8570: 1E 22 22 1E 02 02 02 00 55
8578: 1C 22 22 22 2A 12 2C 00 72
8580: 1E 22 22 1E 0A 12 22 00 26
8588: 1C 22 02 1C 20 22 1C 00 ED
8590: 3E 08 08 08 08 08 08 00 AE
8598: 22 22 22 22 22 22 1C 00 75
85A0: 22 22 22 22 22 14 08 00 1D
85A8: 22 22 22 2A 2A 36 22 00 A2
85B0: 22 22 14 08 14 22 22 00 C5
85B8: 22 22 14 08 08 08 08 00 D0
85C0: 3E 20 10 08 04 02 3E 00 1A
85C8: D8 78 85 45 86 46 84 47 01
85D0: A6 07 0A 0A 80 04 10 3E C6
85D8: 30 04 10 01 E8 E8 0A 86 94
85E0: 1B 18 65 06 85 1A 90 02 44
85E8: E6 1B A5 28 85 08 A5 29 26
85F0: 29 03 05 E6 85 09 A2 08 FD
85F8: A0 00 B1 1A 24 32 30 02 78
8600: 49 7F A4 24 91 08 E6 1A FC
8608: D0 02 E6 1B A5 09 18 69 77
8610: 04 85 09 CA D0 E2 A5 45 F0
8618: A6 46 A4 47 58 4C F0 FD E6
8620: 4C 34 86 A0 00 A9 00 99 7B
8628: 3F 89 98 18 69 06 A8 C0 41
8630: 60 90 F2 C6 20 44 86 20 35
8638: B7 86 20 C6 88 20 E5 86 4A
8640: 20 13 87 60 A9 DF 85 FE EF
8648: A9 88 85 FF A9 00 85 FC 52
8650: A9 80 85 FD A0 00 B1 FC 48
8658: 91 FE A0 02 B1 FC 20 98 7C
8660: 88 91 FE 88 8A 91 FE B1 C8
8668: FC F0 15 18 C8 B1 FE 69 C8
8670: 04 C9 07 90 02 E9 07 91 33
8678: FE 88 B1 FE 69 24 91 FE 4B
8680: A0 03 B1 FC 91 FE C8 B1 70
8688: FC 91 FE C8 B1 FC 91 FE 88
8690: C8 18 A5 FE 69 06 85 FE 1A

```

```

8698: 90 02 E6 FF 18 A5 FC 69 06
86A0: 06 85 FC 90 02 E6 FD A5 08
86A8: FE C9 3F D0 A7 A5 FF C9 3A
86B0: 89 F0 03 4C 54 86 60 A9 0B
86B8: DF 85 FE A9 88 85 FF A0 8C
86C0: 00 B1 FE F0 07 C8 20 2D F1
86C8: 87 20 49 87 18 A5 FE 69 02
86D0: 06 85 FE 90 02 E6 FF C9 A0
86D8: 3F D0 07 A5 FF C9 89 D0 FF
86E0: 01 60 4C BF 86 A9 3F 85 EA
86E8: FE A9 89 85 FF A0 00 B1 9D
86F0: FE F0 07 C8 20 2D 87 20 0C
86F8: 49 87 18 A5 FE 69 06 85 19
8700: FE 90 02 E6 FF C9 9F D0 98
8708: 07 A5 FF C9 89 D0 01 60 92
8710: 4C ED 86 A9 DF 85 FE A9 E8
8718: 88 85 FF A9 3F 85 EC A9 FA
8720: 89 85 ED A0 5F B1 FE 91 6E
8728: EC 88 10 F9 60 B1 FE 8D C6
8730: D8 88 C8 B1 FE 8D D9 88 6C
8738: C8 B1 FE 8D DA 88 C8 B1 0D
8740: FE 85 FC C8 B1 FE 85 FD EE
8748: 60 AD D9 88 D0 06 A9 22 CA
8750: A0 88 D0 27 C9 04 80 14 32
8758: 38 49 FF 69 03 8D 62 87 07
8760: 0A 69 00 8D FF 87 A9 F2 0C
8768: A0 87 D0 0F E9 04 8D 73 A2
8770: 87 0A 69 00 8D CE 87 A9 53
8778: BA A0 87 8D A3 87 8C A4 CF
8780: 87 A0 00 B1 FC 8D DC 88 F6
8788: C8 B1 FC 8D D0 88 18 A5 C7
8790: FC 69 02 85 FC 90 02 E6 26
8798: FD AD DA 88 8D DB 88 20 03
87A0: 30 88 20 FF FF 18 A5 FC 96
87A8: 6D DC 88 85 FC 90 02 E6 24
87B0: FD EE DB 88 CE DD 88 D0 4E
87B8: E6 60 AC DC 88 DB E6 EC D7
87C0: A9 00 85 1E B1 FC 0A 08 D4
87C8: 4A A2 00 86 1F F0 00 4A 15
87D0: 66 1F 4A 66 1F 4A 66 1F 98
87D8: 05 1E 28 66 1F A6 1F 86 B5
87E0: 1E 51 EC 91 EC 88 10 DC 90
87E8: C8 C6 EC A5 1E 51 EC 91 A7
87F0: EC 60 A0 00 84 1E B1 FC 9F
87F8: 0A 08 A2 00 86 1F F0 00 F5
8800: 0A 26 1F 0A 26 1F 0A 26 0C
8808: 1F 28 6A 05 1E A6 1F 86 A0
8810: 1E 51 EC 91 EC C8 CC DC 3C
8818: 88 D0 DB A5 1E 51 EC 91 19
8820: EC 60 AC DC 88 88 B1 FC E9
8828: 51 EC 91 EC 88 10 F7 60 F2
8830: AD DB 88 29 3F A8 B9 58 1B
8838: 88 05 E6 85 ED AD DB 88 6A
8840: 29 08 F0 02 A9 80 18 2C D1
8848: DB 88 70 04 10 04 69 28 43
8850: 69 28 6D DB 88 85 EC 60 EF
8858: 00 04 08 0C 10 14 18 1C 49
8860: 00 04 08 0C 10 14 18 1C 51
8868: 01 05 09 0D 11 15 19 1D 59
8870: 01 05 09 0D 11 15 19 1D 61
8878: 02 06 0A 0E 12 16 1A 1E 69
8880: 02 06 0A 0E 12 16 1A 1E 71
8888: 03 07 0B 0F 13 17 1B 1F 79
8890: 03 07 0B 0F 13 17 1B 1F 81
8898: 8D A4 88 A9 00 8D DE 88 C1
88A0: A2 04 18 69 00 6A 6E DE 03
88A8: 88 4A 6E DE 88 4A 6E DE 75
88B0: 88 CA D0 EE AA AD DE 88 14
88B8: 2A 2A 2A 2A 29 07 C9 07 51
88C0: D0 03 A9 00 E8 6A A5 E6 2B
88C8: C9 40 A9 00 2A AA BD 54 CF
88D0: C0 A5 E6 49 60 85 E6 60 84

```



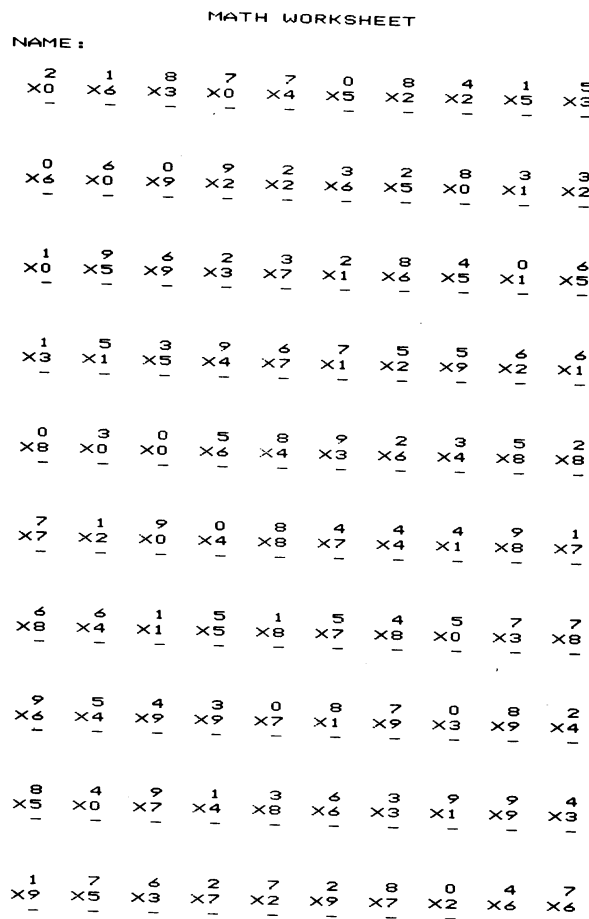
# Math Worksheet

Kenneth Marineau

Apple Version by Tim Midkiff, Editorial Programmer

*Here's a quick and easy way to create math problem worksheets for children. Each worksheet is different every time it's printed. For the Apple II+, IIe, and IIf using either DOS 3.3 or ProDOS. The program requires a serial printer.*

There are any number of ways to teach children basic math skills. One of the traditional methods is the worksheet. A worksheet has several advantages over a computer game or drill program. It can be photocopied and used by many children at the same time. There are no com-



*Addition, subtraction, or multiplication worksheets can be generated with only two keypresses. The program's randomizing feature insures that each worksheet will be different each time.*

mands or keypresses to learn, and it can be used at almost any time or place. A worksheet insures that the problems are covered, and, if you desire, completing the worksheet can be timed.

A major disadvantage of the worksheet, however, is that the student soon begins to memorize the sequence of answers. "Math Worksheet" solves this problem by creating 100 problems using numbers 0-9, randomizing the problems, and printing a worksheet with ten rows of ten problems each. Each problem is different from the others, covering all 100 possible combinations, and each worksheet is different



from the previous one, preventing memorization of the answers.

Math Worksheet can produce worksheets for addition, multiplication, and subtraction. The subtraction worksheet consists of 50 problems—each problem appears twice on the worksheet. (This is because the program doesn't allow a subtraction problem that would result in a negative answer.)

The worksheet is printed double width for easy reading by young children. [Line 270 places the printer in double-width mode with CHR\$(14). If your printer uses a code other than CHR\$(14), you'll have to make the appropriate change.]

## Ready, Print

It's easy to use Math Worksheet—just follow the prompts. After typing in the program and saving a copy, load it and type RUN. You'll first have a choice of creating a subtraction, addition, or multiplication worksheet (press S, A, or M—make sure you have the Caps Lock key pressed down). After you select one of these, numbers appear on the screen and the randomizing process begins. It takes only a few seconds. Next, you're asked to position the printer's printhead about 1/4-inch below the paper perforation and then to press any key to begin printing. Once your paper is adjusted for the first printout, you shouldn't have to readjust it if you're using standard-size paper. Stop the printing at any time by pressing down and holding the Q (Quit) key. You can print as many worksheets as you want, in any combination of addition, subtraction, and multiplication, by pressing the R key after each worksheet is completed.

Math Worksheet assumes that you have a serial interface card in slot 1 of your Apple II+ or IIe (if you're using an Apple IIc, there's nothing to worry about). If you have the serial card installed in another slot, either move the card to slot 1 or change the PR#1 statement in line 270 to PR#X, where X is the slot number where the card is located.

The program has been tested using an Epson printer, an Epson-compatible printer, and an ImageWriter. It doesn't seem to work with an ImageWriter II. If you have another kind of printer, it's possible that you'll have problems with Math Worksheet.

## Math Worksheet

*Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following programs.*

```
C7 10 HOME :F$ = "WORKSHEET": VTAB 2: HTA
      B 8: PRINT "A)DDITION "F$
64 20 PRINT : HTAB 8: PRINT "S)UBTRACTION
      "F$
```

```
82 30 PRINT : HTAB 8: PRINT "M)ULTIPLICAT
      ION "F$
93 40 VTAB 9: HTAB 6: PRINT "PRESS KEY TO
      SELECT WORKSHEET": HTAB 6: PRINT C
      HR$ (7)">";
09 50 GET K$: IF K$ = "A" THEN S$ = "+":
      GOTO 90
8F 60 IF K$ = "S" THEN S$ = "-": GOTO 90
37 70 IF K$ = "M" THEN S$ = "X": GOTO 90
C4 80 GOTO 50
F7 90 DIM A$(100),P$(100)
95 100 HOME : HTAB 14: PRINT "MATH WORKSH
      EET"
2B 110 HTAB 13: PRINT "CREATING PROBLEMS"
A1 120 FOR I = 0 TO 9:N$(I) = RIGHT$ ( ST
      R$ (I),1): NEXT I: I = 0
6A 130 FOR K = 0 TO 9: FOR L = 0 TO 9
04 140 IF S$ = "-" AND VAL (N$(K)) < VAL
      (N$(L)) THEN A$(I) = N$(L) + N$(K)
      : GOTO 160
82 150 A$(I) = N$(K) + N$(L)
DA 160 PRINT " "A$(I)" ";: I = I + 1: NEXT
      L,K
91 170 VTAB 2: HTAB 11: PRINT "RANDOMIZIN
      G PROBLEMS"
56 180 FOR J = 0 TO 99:P$(J) = J: NEXT
0A 190 FOR J = 0 TO 99
AB 200 I = INT ( RND (1) * 100)
B0 210 T% = P$(J):P$(J) = P$(I):P$(I) = T
      %: NEXT
9E 220 VTAB 16: HTAB 4: PRINT "POSITION P
      RINHEAD ABOUT 1/4 INCH"
72 230 HTAB 8: PRINT "BELOW PAPER PERFORA
      TION."
40 240 HTAB 7: PRINT "PRESS Q TO ABORT PR
      INTING"
DD 250 PRINT : HTAB 9: PRINT "PRESS ANY K
      EY TO START": HTAB 9: PRINT CHR$ (
      7)">";
7F 260 GET K$: IF K$ = "Q" THEN 350
2E 270 PRINT : PRINT CHR$ (4)"PR#1": PRIN
      T CHR$ (9)"40N":D$ = CHR$ (14)
FE 280 PRINT D$ SPC( 13)"MATH WORKSHEET":
      PRINT
45 290 PRINT D$"NAME:": PRINT
B2 300 FOR I = 0 TO 90 STEP 10
FA 310 FOR J = I TO 9 + I: PRINT D$" ";
      LEFT$ (A$(P$(J)),1)" ";: NEXT : PR
      INT
99 320 FOR J = I TO 9 + I: PRINT D$" "S$;
      RIGHT$ (A$(P$(J)),1)" ";: NEXT :
      PRINT
59 330 FOR J = I TO 9 + I: PRINT D$" - "
      ;: NEXT
45 340 FOR L = 1 TO 4: PRINT : NEXT
C7 350 POKE 49168,0:K = PEEK (49152): IF
      K = 81 THEN PRINT CHR$ (4)"PR#0":
      CLEAR : GOTO 10
4F 360 NEXT : PRINT : PRINT CHR$ (4);"PR#
      0"
95 370 VTAB 21: HTAB 5: PRINT "PRESS R TO
      DO ANOTHER WORKSHEET"
B0 380 HTAB 5: PRINT "PRESS Q TO QUIT"
FE 390 GET K$: IF K$ = "R" THEN CLEAR : G
      OTO 10
C0 400 IF K$ = "Q" THEN END
99 410 GOTO 390
```

88

# Easy Apple Screen Editing

Roland Brown

*Enhanced by Tim Victor, Editorial Programmer*

*Here's a way to make BASIC programming easier and more fun: an advanced screen editor that makes up for the Apple's lack of full-screen editing. This outstanding programming utility works on any Apple II-series computer using either DOS 3.3 or ProDOS, in 80-column as well as 40-column mode.*

Although Applesoft BASIC is a powerful language, its screen editor leaves much to be desired. Some Apple II owners invest in a ROM editor, others write their programs with a word processor, and the rest just suffer with the frustrating ESCape mode editing. But ROM editors cost money, word processors don't let you flip back and forth between the text editor and BASIC to test changes, and suffering isn't *always* good for the soul. So here's a better solution: "BASIC Line Editor," a powerful utility that lets you easily modify BASIC program lines.

Because the BASIC Line Editor program is written entirely in machine language, it must be entered with the "Apple MLX" machine language entry program found elsewhere in this issue. Be sure you read and understand the instructions for using MLX before you begin entering the data. When you run MLX, you'll be asked for a starting address and an ending address for the data you will be entering. For BASIC Line Editor, the proper values are as follows:

**Starting address:** 2000

**Ending address:** 23C6

When you have entered all the data, be sure to use the Save option to save at least one copy before you leave MLX.

Once you've entered all the data and saved a copy, you're ready to use the BASIC Line Editor. Start it by typing *BRUN filename* and press-

ing Return (substitute the filename you used when you saved the BASIC Line Editor data with MLX). The program loads at memory address \$2000 (that's 8192 in decimal notation), then checks to see which operating system is present before moving itself to a safe location. This process can destroy part of a long BASIC program. If you have a long BASIC program in memory, you should save it *before* you activate the BASIC Line Editor.

Now you're ready to put the Editor to work. To edit a BASIC program line, type the ampersand (&) followed by the desired line number. For instance, enter &100 to edit line 100. The BASIC Line Editor displays the line on the screen in a format somewhat different from Applesoft's. The line is continuous rather than centered on the screen, there are no extra spaces in the line except between quotation marks, and all control characters are displayed in reverse video.

## Editing Commands

The BASIC Line Editor provides 13 new editing functions. Most are accessed by pressing the Ctrl (Control) key along with a letter key. Here's a quick reference table followed by a detailed description of each command:

Key	Function
Ctrl-B	Block back
Ctrl-C	Convert hex to decimal
Ctrl-D	Delete right
Ctrl-F	Block forward
Ctrl-H	Cursor left
Ctrl-I	Insert
Ctrl-M	Return
Ctrl-S	Search
Ctrl-T	Truncate
Ctrl-U	Cursor right
Ctrl-V	Verbatim

*"Easy Apple Screen Editing" was originally published in the September 1985 issue of COMPUTE!.*

Delete	Delete left
Esc	Return to BASIC

**Ctrl-B** (block back) moves the cursor back to the previous colon, or if there is no previous colon, to the beginning of the line.

**Ctrl-C** (convert hex) converts hexadecimal numbers to decimal. This command moves the cursor above the line being edited, prints a \$ prompt on the screen, and waits for you to enter a number. This value is converted to decimal and printed. Then the cursor returns to its original position on the line.

**Ctrl-D** (delete right) deletes the character under the cursor. The cursor stays where it is, and everything to the right moves back one space.

**Ctrl-F** (block forward) moves the cursor forward to the next colon, or if there is no colon, to the end of the line.

**Ctrl-H** (cursor left) moves the cursor back one space.

**Ctrl-I** (insert) puts the BASIC Line Editor in insert mode. Any characters you type are inserted in the line until you use another Editor command.

**Ctrl-M** (return) is the same as pressing Return. No matter where the cursor is located on the line, pressing Ctrl-M enters the line into the program.

**Ctrl-S** (search) searches for the next character entered. If the search fails—in other words, if there is no character specified from the cursor to the end of the line (or if there's no such character in the line at all)—the cursor moves to the end of the line.

**Ctrl-T** (truncate) truncates the line at the cursor position (deletes everything after the cursor). The cursor ends up one space beyond the new end of the line.

**Ctrl-U** (cursor right) moves the cursor forward one space.

**Ctrl-V** (verbatim) lets you enter control characters verbatim. If the keypress immediately after Ctrl-V is a Control key combination, it's interpreted as a control character rather than as a BASIC Line Editor command. Ctrl-V is useful for adding Return (Ctrl-M) or backspace (Ctrl-H) characters to a line for improved printing control. If the keypress immediately following Ctrl-V is not a Control key combination, Ctrl-V has no effect. Remember that the BASIC Line Editor shows control characters in reverse video.

**Delete** (delete left) deletes the character to the left of the cursor and moves the cursor back one space. (The Delete key is found only on the IIf and IIfc.)

**Esc** (return to BASIC) puts you back in BASIC. If you make a mistake when editing a line with the BASIC Line Editor, press Esc to exit back to BASIC without losing the line.

## Program Notes

Activating the Editor resets the stack to the same level as does BASIC, sets up the ampersand vector (\$3F5), moves the DOS buffers downward to protect DOS, and restarts BASIC. The Editor uses existing BASIC routines to read the input line and find the desired line in memory. If you try to edit a line that doesn't exist, the Editor simply returns to BASIC. If the line is found, its contents are read and listed on the screen. Text characters are listed just as they are stored. When the Editor finds a token (an encoded BASIC keyword), it locates the word in the BASIC keyword table and lists it on the screen.

Once the Editor lists the line, it enters editing mode. This part of the program gets a command from the keyboard, processes it, and updates the screen. Space doesn't permit a detailed explanation of how each Editor command works. If you're familiar with Apple machine language programming, you may find it interesting to trace through the various routines on your own.

## BASIC Line Editor

*For mistake-proof program entry, use "Apple MLX," found elsewhere in the issue, to type in this program.*

```

2000: AD 00 BF C9 4C D0 0D A9 15
2008: 03 20 F5 BE 18 A5 74 69 26
2010: 04 4C 1B 20 38 A5 74 E9 F5
2018: 03 85 74 85 CF 8D AF 20 56
2020: A5 73 85 CE 8D AE 20 A9 BE
2028: B1 85 EB A9 20 85 EC A0 4C
2030: 00 B1 EB 91 CE E6 CE D0 F3
2038: 02 E6 CF E6 EB D0 02 E6 29
2040: EC A5 EB C9 46 D0 EA A5 6B
2048: EC C9 23 D0 E4 B1 EB E6 8F
2050: EB D0 02 E6 EC 8D B0 20 88
2058: 11 EB F0 29 AD B0 20 18 55
2060: 6D AE 20 85 CE B1 EB E6 5B
2068: EB D0 02 E6 EC 6D AF 20 1E
2070: 85 CF 18 B1 CE 6D AE 20 2F
2078: 91 CE C8 B1 CE 6D AF 20 15
2080: 91 CE 88 F0 C8 AD AE 20 D7
2088: 8D F6 03 AD AF 20 8D F7 99
2090: 03 A9 4C 8D F5 03 A0 0B 27
2098: B9 A2 20 20 F0 FD 88 10 05
20A0: F7 60 8D D9 C4 C1 C5 D2 CF
20A8: A0 B2 C5 CC C2 8D 38 20 48
20B0: 20 20 0C DA 20 1A D6 B0 FF
20B8: 01 60 68 68 20 9C FC A0 33
20C0: 02 B1 9B C8 AA B1 9B 20 E1
20C8: 24 ED A0 06 8C 7B 05 84 EB
20D0: CE A5 25 8D 97 02 A5 9B 0B
20D8: 85 EB A5 9C 85 EC A0 04 7A
20E0: B1 EB C8 C9 00 F0 2C 10 D6

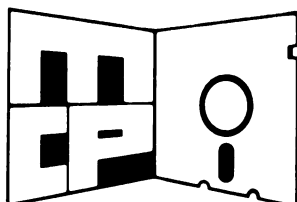
```



20E8: 24 A2 D0 BE 44 00 BE 45 6B  
 20F0: 00 29 7F AA AD FF FF 30 B3  
 20F8: 11 E0 00 D0 03 20 48 01 31  
 2100: EE 44 00 D0 EF EE 45 00 9D  
 2108: D0 EA CA 10 F3 20 48 01 79  
 2110: 38 B0 CD A0 06 A9 C0 8D 44  
 2118: 98 02 84 CF 20 22 01 20 60  
 2120: 0C FD C9 FF D0 02 A9 80 83  
 2128: C9 A0 90 51 2C 98 02 30 96  
 2130: 0F 70 41 8D 46 01 20 23 B0  
 2138: 02 A9 C0 8D 98 02 30 DA DE  
 2140: 70 22 48 A4 CF 84 E3 A4 93  
 2148: CE 8C 95 02 C8 20 EC 01 89  
 2150: 84 CF 20 60 01 CE 95 02 43  
 2158: C6 CF A4 E3 C4 CF D0 F2 BE  
 2160: 20 22 01 68 20 6E 01 A4 43  
 2168: CF C4 CE C8 90 03 20 EC E7  
 2170: 01 4C 69 00 A4 CF A9 C0 EB  
 2178: 8D 98 02 30 9D 2C 98 02 BB  
 2180: 30 0D 50 F0 A2 C0 8E 98 05  
 2188: 02 49 C0 C9 40 D0 D5 A2 66  
 2190: C0 8E 98 02 C9 8D F0 0C 7C  
 2198: C9 98 F0 2E A4 CF 20 FD 4A  
 21A0: 01 4C 69 00 A0 00 84 CF 81  
 21A8: 20 22 01 20 9B 01 49 80 99  
 21B0: 10 02 29 3F A4 CF 99 00 2C  
 21B8: 02 C8 C4 CE D0 E8 A9 00 31  
 21C0: 99 00 02 A0 01 A2 FF 4C F8  
 21C8: 44 D4 A4 CE 20 22 01 A0 10  
 21D0: 00 F0 EB 48 AD 97 02 85 A6  
 21D8: 25 98 C5 21 90 06 E5 21 28  
 21E0: E6 25 B0 F6 85 24 8D 7B 88  
 21E8: 05 20 22 FC 68 60 84 CF 67  
 21F0: 20 22 01 20 9B 01 C9 46 AB

21F8: 60 8C 96 02 09 80 C9 A0 FF  
 2200: B0 02 49 C0 20 6E 01 A4 B3  
 2208: CE C8 20 EC 01 AC 96 02 A2  
 2210: 60 AC 95 02 20 22 01 20 2E  
 2218: 9B 01 A4 CF 20 22 01 8D 15  
 2220: 99 02 A5 25 48 AD 7B 05 AD  
 2228: 85 24 48 AD 99 02 20 F0 22  
 2230: FD 68 CD 7B 05 D0 07 C5 3E  
 2238: 24 A5 24 8D 7B 05 68 90 A6  
 2240: 07 C5 25 D0 03 CE 97 02 AF  
 2248: AD 99 02 60 AD 7B 05 AC 22  
 2250: B3 FB C0 06 D0 16 2C 1F 3C  
 2258: C0 10 11 8D 01 C0 48 38 CF  
 2260: 65 20 4A 90 03 2C 55 C0 E5  
 2268: 68 69 00 4A A8 B1 28 2C 68  
 2270: 54 C0 60 C0 00 F0 25 20 55  
 2278: F7 01 84 CF 84 E3 20 0F 89  
 2280: 02 8C 95 02 C4 CE F0 0D 0C  
 2288: 20 60 01 EE 95 02 E6 CF 56  
 2290: AC 95 02 D0 EF A4 CF 20 AF  
 2298: EC 01 A4 E3 60 84 CE 20 39  
 22A0: 22 01 20 9C FC A4 CE 60 7C  
 22A8: C0 00 F0 01 8B 60 A2 0B 91  
 22B0: CA 30 FA DD 7F 02 D0 F8 42  
 22B8: 8D 8A 02 8D 0E 02 B0 FF 71  
 22C0: C4 CE F0 01 C8 60 A9 80 E4  
 22C8: 2C A9 00 2C A9 40 8D 98 52  
 22D0: 02 60 A9 BA 8D 46 01 A4 3B  
 22D8: CF C4 CE F0 06 C8 20 3D EF  
 22E0: 01 D0 F4 A4 CF 60 A9 BA D0  
 22E8: 8D 46 01 A4 CF F0 06 88 C6  
 22F0: 20 3D 01 D0 F6 A4 CF 60 0C  
 22F8: AC 97 02 88 84 25 20 22 5D  
 2300: FC A9 00 8D 7B 05 20 9C D4

aa



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(please print)

Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_

## Apple Applications Disk

Typing in a long BASIC or machine language program can be a time-consuming task. Even with sophisticated error-checking programs like "Apple Automatic Proofreader" and "Apple MLX," you still have to spend hours in front of the computer.

That's why we've made available for purchase a disk containing all the programs in this issue. Formatted on one side for DOS 3.3, on the other for ProDOS, the *Apple Applications Disk* costs \$12.95, plus \$2.00 shipping and handling, and can only be purchased through COMPUTE! Publications. See page 16 for details.

# Your Graphics Primer

Gregg Keizer, Editor, and Tim Victor, Editorial Programmer

*Graphics are a vital part of any successful Apple II program, whether it's a commercial blockbuster or a homemade game that never leaves your house. Hi-res graphics, the most impressive graphics available on the current crop of machines, can be needlessly complicated. This beginner's primer painlessly gets you started with a set of dazzling tricks and tips.*

**Turn on the hi-res screen.**     10 HGR  
   or  
   10 HGR2

Every Apple II-series computer has two hi-res screens, each with a resolution of 280 dots wide and 192 dots high. That means it takes more than 53,000 dots (usually called *pixels*) to fill the screen.

To switch to the first hi-res screen, type HGR anytime you see the ] prompt. Enter HGR2 to get to the second hi-res screen.

**Turn off the text window**     10 POKE 49234,0

If you move to the first hi-res screen, you'll notice that text is still displayed near the bottom of the screen. Press the Return key a few times, and you'll see characters disappear as they scroll up. This part of the hi-res screen is called the *text window*, and it can be used for a variety of tasks. You've probably seen examples, where a game displays graphics at the top of the screen and text near the bottom.

To eliminate the text window and make the entire screen hi-res, just type POKE 49234,0. (Actually, it doesn't matter what number you use after the comma. In fact, you can even use the PEEK command [use something like PRINT PEEK(49234)] and get the same results.)

**Turn on the text window**     10 POKE 49235,0

Say you decide you want that text window back. It's simple, though you have to do your typing blind. Enter POKE 49235,0 (again, any number after the comma is fine), press Return, and the text area reappears.

**Choose a color**     10 HCOLOR=X

You've typed HGR or HGR2, and the hi-res screen is in front of you. Exciting, isn't it? Painting the screen something besides black isn't hard, though. To start, you have to choose a color, since the color preselected by the computer is black. Black on black won't make you an artist.

You have eight color choices when you're in hi-res graphics, though it may not look like it on your screen. Fill in the X above with a number from 0 through 7.

Number	Color
0	Black
1	Green
2	Purple
3	White
4	Black
5	Orange or yellow
6	Blue
7	White

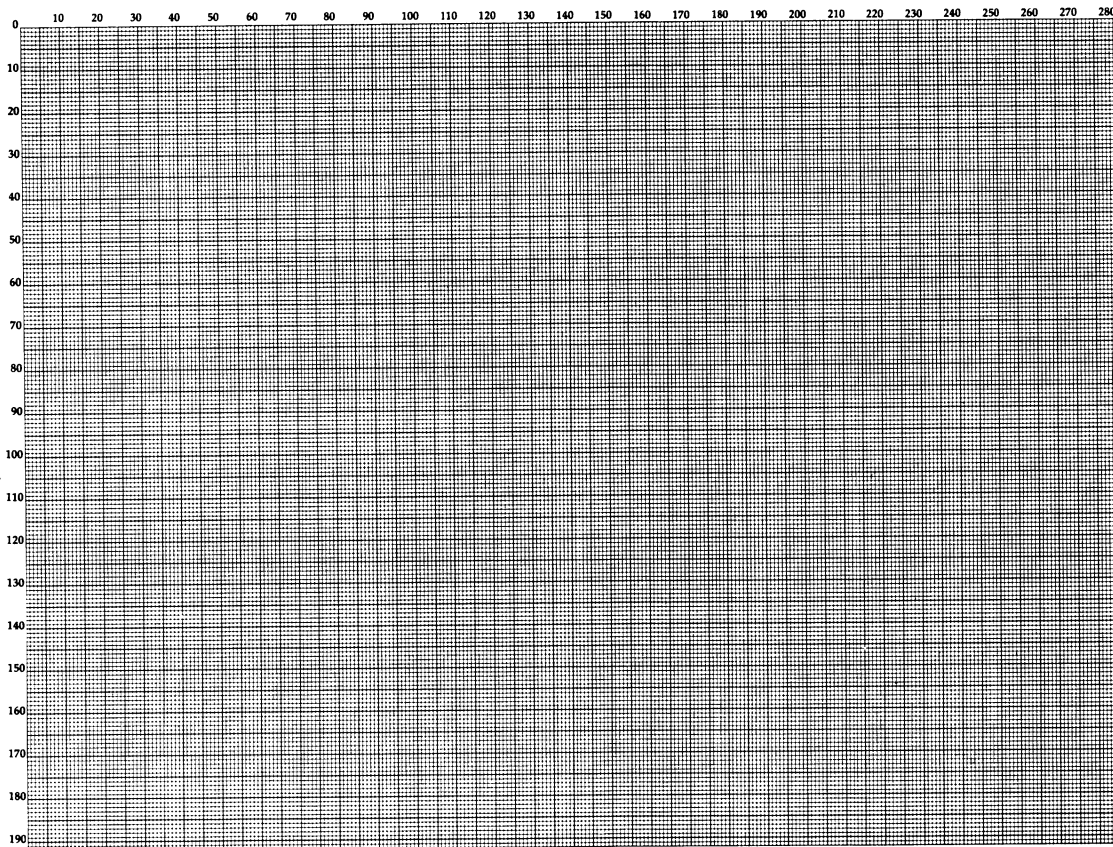
Let's pick a color—say, blue. Type HCOLOR=6, and press Return. Nothing happened, right? Don't worry, something will.

**Light a dot**     10 HPlot X,Y

The hi-res screen without a text window has 280 columns and 192 rows of pixels (the text screen cuts off the bottom 32 rows, so a hi-res screen with the text area active has only 160 rows).

To light up a pixel, all you have to do is specify the column and row number in the HPlot statement. The column number must be between 0 and 279, while the row number must

**Figure 1: Columns And Rows**



be in the range 0–191 (0–159 if you have the text window active and want all the graphics to show).

Try it out—type `10 HPLOT 140,96`. A small blue dot should appear right about in the middle of the screen. Type `20 HPLOT 140,97` and press Return. Another dot, this one just below the first, lights up. Do it again—type `30 HPLOT 140,98` and hit Return.

It's the beginning of a line. But drawing a line like this would take forever. That's why there's another, faster method.

**Draw a line** `10 HPLOT X1,Y1 TO X2,Y2`

Drawing a line is as simple as connect-the-dots. When you put the `TO` between two sets of column and row coordinates, the Apple automatically draws a line between the points.

Type `10 HPLOT 140,96 TO 0,0` and press Return. A blue line (unless you've changed the color with `HCOLOR`) magically runs from the middle of the screen to the upper right-hand corner. Notice that diagonal lines appear a bit jagged. You haven't done anything wrong. That's a characteristic of almost all computer screens.

**Make a box** `10 HPLOT X1,Y1 TO X2,Y2 TO X3,Y3 TO X4,Y4 TO X1,Y1`

You can draw a rectangle, square, or almost any other multisided shape by stringing `HPLOT` co-

ordinates together. In effect, you're drawing one line after another.

Type `10 HPLOT 50,50 TO 150,50 TO 150,150 TO 50,150 TO 50,50` and press Return. A rectangle appears on the screen (assuming you've set `HCOLOR` to something other than black). The four lines making up this rectangle are

```
50,50 TO 150,50
150,50 TO 150,150
150,150 TO 50,150
50,150 TO 50,50
```

A triangle is even easier to create, since you need to draw only three lines. Type `10 HPLOT 0,0 TO 50,0 TO 50,50 TO 0,0` and a small triangle shows up in the left-hand corner of the screen.

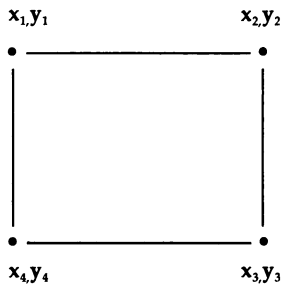
You can draw as many lines as you want by connecting them with the `TO` statement, as long as the program line you're writing isn't longer than 239 characters. That's the limit in Applesoft BASIC.

**Fill a box** `10 HPLOT X1,Y1 TO X2,Y2 TO X3,Y3 TO X4,Y4 TO X1,Y1`  
`20 FOR A = 0 TO (Y4 - Y1)`  
`30 HPLOT X1,Y1 + A TO X2,Y2 + A`  
`40 NEXT A`

This may look complicated, but it's not. To use this four-line routine, though, you'll have to set up your rectangle or square like this:



Figure 2: Draw It This Way



Let's try it out. Type in this short program and run it:

```
5 HGR
6 HCOLOR=6
10 HPLOT 50,50 TO 150,50 TO 150,150 TO 50,150 TO
   50,50
20 FOR A = 0 TO (150-50)
30 HPLOT 50,(50+A) TO 150,(50+A)
40 NEXT A
```

First, the box is drawn on the screen—that's line 10. Lines 20, 30, and 40 are all part of a FOR-NEXT loop which draws 100 lines across the inside of the box, each line one pixel below the last.

You can use this technique only with rectangles and squares—it won't work with

## Hi-Res Character Graphics For The Apple II

Tim Victor, Editorial Programmer

*"HROUT," a short machine language utility, lets you print text on the Apple II's hi-res screens. For all Apple II-series computers using either DOS 3.3 or ProDOS.*

"HROUT" is a machine language graphics utility which will work on any Apple II-series computer. Just as important, it's fully relocatable so that it can be installed anywhere in RAM. HROUT links into the standard character output vector and permits text to be displayed on either hi-res screen. Because the standard text output routine is also active, the PRINT command, and any other text commands, can be used to create hi-res text. HROUT's only limitation is that it can't perform screen scrolls at the bottom of the screen. HROUT uses the same character sets as "HRCG," the character generator included on the *DOS Tool Kit* disk. Several character sets are on the *DOS Tool Kit* disk, and more sets can be created with "Apple SuperFont," a program published in the April 1985 issue of *COMPUTE!* magazine. To get you started, we've included a new character set with HROUT.

### Putting HROUT On Disk

To make it easy to enter, HROUT is listed in our "Apple MLX" format. Make sure you have a copy of Apple MLX (found elsewhere in this issue) on disk and have read the instructions that accompany the article.

Once it's run, Apple MLX will ask you to enter two numbers, a starting and an ending address for HROUT. Your responses should be

STARTING ADDRESS: 0300  
ENDING ADDRESS: 0357

Type in the short listing and save it using the filename HROUT.

### In Your Own Programs

To use HROUT in your own programs, BLOAD it into memory. It can be loaded almost anywhere in memory, but to make things simpler, we'll use location \$300. (Don't place HROUT in the first 256 bytes of RAM—locations 0-255. The Apple's operating system uses this area to store important data. Changing anything here could easily cause your computer to crash.)

HROUT needs a character set to display, since the character ROM used in text mode can't be read by the CPU. Each character set can contain 96 characters, using eight bytes per character. A set can be created with "HRCG" or "Apple SuperFont," then BLOADED from disk with

**BLOAD NORMALSET,A\$8D00**

This command loads a character set, called **NORMALSET**, at \$8D00, near the top of available RAM.

*Note: The data you need to create the NORMALSET character set is included at the end of this article. Use Apple MLX to type in NORMALSET, using the starting and ending addresses posted at the beginning of the listing. Make sure NORMALSET is on the same disk as HROUT.*

If you'll be using HROUT from a BASIC program, you need to protect the character set so that string storage won't overwrite it. The command to do this is

**HIMEM: 137\*256**

*Note: This will cause problems in ProDOS if you try to do any disk operations—it keeps the*

triangles and other multisided shapes.

**Turn off the hi-res screen**      **10 POKE 49233,0**

You can return to the text page at any time by using this POKE statement. (An easier, though "dirtier" method is to press the Control and Reset keys at the same time.)

**Color the entire hi-res screen**      **10 HGR**  
   **20 POKE 28,X: CALL**  
   **62454**

You can instantly transform the entire hi-res screen (either screen 1 or screen 2) with one POKE statement and one CALL statement.

The numbers you can use in place of the X

in the POKE statement are different from the normal hi-res color numbers:

Number	Color
0	Black
42	Green
85	Purple
127	White
128	Black
170	Orange or yellow
213	Blue
255	White

Just type 10 HGR and 20 POKE 28,213: CALL 62454 and the screen should turn blue. Note the text window still at the bottom of the

*operating system from setting up a file buffer. You can cancel this before disk I/O with HIMEM: 150\*256,, then restore it when the disk operations are done.*

You have to let HROUT know which character set to use by POKEing the address of the character set into locations 6 and 7, in a low-byte/high-byte format. If you put your character set at \$8D00 (36096 decimal), the POKEs are

**POKE 6,0 : POKE 7,141**

(Remember that you POKE the low-byte value into location 6. The high-byte value, 141 here, is multiplied by 256— $141*256=36096$ ).

If you're using DOS 3.3, you can activate HROUT by entering

**POKE 54,0 : POKE 55,3 : CALL 1002**

When in immediate mode, you must enter these commands together on a multistatement line (separated by colons). They can be on separate lines in a BASIC program, but the three commands should be executed one after another. Since locations 54 and 55 are being POKed with the low and high bytes of the address of HROUT, these POKEs will be different if you put HROUT somewhere other than \$300.

From ProDOS, it's easier to turn on HROUT. Just type

**PR# A\$300**

Since the last instruction in HROUT is a jump to COUT1, the monitor routine to display a character on the text screen, nothing should appear any different when you're in text mode. To see the hi-res text, type HGR to enable the hi-res screen and HOME to get the cursor out of the four-line text window. You should see whatever you're typing displayed on the screen in a hi-res character set.

In DOS 3.3, HROUT can be canceled with this command sequence:

**POKE 54,240 : POKE 55,253 : CALL 1002**

To cancel HROUT in ProDOS, enter

**PR#0**

## Cursors And Scrolling

Since HROUT concludes by calling the standard ROM routine for displaying a character on the text screen, all cursor control remains the same. You can move to any location on the screen by using the HTAB and VTAB commands. HOME still moves the cursor to the upper left of the screen, but won't clear the hi-res screen. To get the equivalent of a text HOME, use HOME : CALL -3092. The routine at -3092 clears the current hi-res screen and turns on hi-res graphics.

If you need to know what's where on the screen, you can PEEK to the text screen. By taking a couple of precautions, both text and hi-res screens should be the same. First of all, make sure that you clear both screens at the same time, as mentioned above. Second, don't let the text screen scroll. In order to make HROUT as small (88 bytes) and fast as possible, no provision has been made for scrolling the screen. This could even be to your advantage for many applications, but you have to be careful if you want the text and graphics screens to agree.

The biggest problem arises when you print to the last character on the twenty-fourth line. Even if you follow the PRINT statement with a semicolon, the cursor will wrap onto the twenty-fifth line, and the screen will scroll. There is a solution: Fool the computer into thinking the screen has 25 lines by using POKE 35,25. The output routine will then have no qualms at all about advancing the cursor to the twenty-fifth line, leaving it there and even printing there. A lot of responsibility now rests on your shoulders, because the twenty-fifth line doesn't really exist. Printing something there is the same thing as POKEing out of the range of the text screen. That could cause significant problems.

screen. If you enter 30 POKE 49234,0, the text window vanishes and the blue replaces it.

Turn on the hi-res screen with out clearing it

```

10 POKE 49232,0
20 POKE 49234,0 (No text window)
or
20 POKE 49235,0 (Text window)
30 POKE 49236,0 (Screen 1)
or
30 POKE 49237,0 (Screen 2)
40 POKE 49239,0

```

If you've been creating hi-res graphics, switch

to a text or low-res screen, and then decide to return to the hi-res screen, you'll need to use these four POKE statements to insure that what you've done isn't erased.

Line 10 accesses the graphics mode. Depending on the version of line 20 that you use, you can specify a full screen or one that includes a text window.

Use the appropriate version of line 30 to return to the right hi-res screen. The POKE in line 40 sets the screen to hi-res (as opposed to low-res) graphics.

Save a hi-res screen

```

10 PRINT CHR$(4) "BSAVE
filename,A$2000,L$2000" (from
hi-res screen 1)

```

## HROUT Zero Page Memory Usage

Hex	Decimal	Usage
\$6-7	6-7	Character set address (low byte, high byte). Set by user to point to first byte of character definitions. Never changed by HROUT, but can be changed by user to switch between character sets.
\$8-9	8-9	Hi-res row address (low byte, high byte). Updated several times whenever a character is drawn. Doesn't need initialization. Can be changed between calls to HROUT with no ill effect.
\$1A-1B	26-27	Character pattern address (low byte, high byte). Also reinitialized with each call.
\$24	36	Monitor column position. Contains cursor's current column. Used but not changed by HROUT. It can be changed with the BASIC HTAB command.
\$25	37	Monitor row position. Can be changed with VTAB.
\$28-29	40-41	BASL,BASH: Monitor's pointer to the start of the current text line. Set by VTAB. Used by HROUT to calculate hi-res row address (\$8-9).
\$32	50	Monitor text attribute (NORMAL, FLASH, INVERSE). HROUT checks here and inverts text if INVERSE or FLASH is in effect.
\$36-37	54-55	Monitor output routine selector (CSWL). Contains address of the standard routine for displaying a character. Normally points to a DOS routine which looks for DOS commands. When this vector is changed and the DOS I/O vectors are reinitialized (CALL 1002), DOS passes its output to HROUT.
\$45-47	69-71	Monitor register storage. HROUT stores the registers here upon entry, then restores them when exiting.
\$E6	230	BASIC hi-res page switch. Set to 32 (\$20) for page one, 64 (\$40) for page two. Used, but not changed by HROUT.

HROUT pays attention to two important BASIC variables: the current hi-res graphics page, zero page location 230 (\$E6), and the current text attribute, location 50 (\$32). Characters will always be printed to the page set by the last HGR or HGR2 unless you POKE a different value into location 230. Text will be drawn on the same screen as HPLOT, HLINE, and so on.

If you change the text attribute with the INVERSE or FLASH command, the bit patterns will be reversed before they are plotted on the screen, inverting the character. The NORMAL command also works, canceling inverted printing.

Now you can label high-resolution charts and graphs with a choice of any font. You can even design these fonts yourself with "HRCG" or the "Apple SuperFont" Editor. Letters of the alphabet can become detailed shapes, permitting fast high-resolution game graphics in BASIC. In fact, we've used this technique ourselves for many of the Apple games published by COMPUTE! Publications.

## HROUT

For mistake-proof program entry, use "Apple MLX," found elsewhere in the issue, to type in the following programs.

START ADDRESS: 0300  
END ADDRESS: 0357

```

0300: D8 78 85 45 86 46 84 47 33
0308: A6 07 0A 0A B0 04 10 3E F8
0310: 30 04 10 01 E8 E8 0A 86 C6
0318: 1B 1B 65 06 85 1A 90 02 76
0320: E6 1B A5 28 85 08 A5 29 58
0328: 29 03 05 E6 85 09 A2 08 30
0330: A0 00 B1 1A 24 32 30 02 AA
0338: 49 7F A4 24 91 08 E6 1A 2E
0340: D0 02 E6 1B A5 09 1B 69 A8
0348: 04 85 09 CA D0 E2 A5 45 22
0350: A6 46 A4 47 58 4C F0 FD 1B

```



```
10 PRINT CHR$(4) "BSAVE
filename,A$4000,L$2000" (from
hi-res screen 2)
```

Once you're done HPLOTting your way around the hi-res screen, you'll certainly want to save the creation. Using the appropriate BSAVE command, you can safely store a hi-res screen on disk for later retrieval. Make sure you specify a *filename* for the picture.

If the hi-res screen has a text window, it's not saved. *Only the hi-res screen itself is saved to disk.*

```
Load a hi-res screen 10 HGR
or
10 HGR2
20 PRINT CHR$(4) "BLOAD
```

```
filename,A$2000" (to hi-res
screen 1)
```

```
or
20 PRINT CHR$(4) "BLOAD
filename,A$4000" (to hi-res
screen 2)
```

First, decide which hi-res screen you're going to use to display the picture, and use either HGR or HGR2 (if you want to eliminate the text window from screen 1, make sure you insert the appropriate POKE statement to turn it off).

Next, use the correct version of line 20 to load the picture to the proper screen. It doesn't matter in which screen the picture was created—you can load a file created on screen 1 into screen 2 sometime later.

## NORMALSET

```
START ADDRESS: 8D00
END ADDRESS: 8FFF
```

```
8D00: 00 00 00 00 00 00 00 00 1B
8D08: 08 08 08 08 08 00 08 00 FA
8D10: 14 14 14 00 00 00 00 00 BC
8D18: 14 14 3E 14 3E 14 14 00 B5
8D20: 08 3C 0A 1C 28 1E 08 00 1B
8D28: 06 26 10 08 04 32 30 00 9B
8D30: 04 0A 0A 04 2A 12 2C 00 43
8D38: 08 08 08 00 00 00 00 00 5A
8D40: 08 04 02 02 02 04 08 00 F0
8D48: 08 10 20 20 20 10 08 00 C2
8D50: 08 2A 1C 08 1C 2A 08 00 97
8D58: 00 08 08 3E 08 08 00 00 BA
8D60: 00 00 00 00 08 08 04 00 E3
8D68: 00 00 00 00 3E 00 00 00 67
8D70: 00 00 00 00 00 00 08 00 9B
8D78: 00 20 10 08 04 02 00 00 46
8D80: 1C 22 32 2A 26 22 1C 00 0D
8D88: 08 0C 08 08 08 08 1C 00 C4
8D90: 1C 22 20 18 04 02 3E 00 6C
8D98: 3E 20 10 18 20 22 1C 00 20
8DA0: 10 18 14 12 3E 10 10 00 BF
8DA8: 3E 02 1E 20 20 22 1C 00 EA
8DB0: 38 04 02 1E 22 22 1C 00 DC
8DB8: 3E 20 10 08 04 04 04 00 B5
8DC0: 1C 22 22 1C 22 22 1C 00 4A
8DC8: 1C 22 22 3C 20 10 0E 00 DF
8DD0: 00 00 08 00 08 00 00 00 2D
8DD8: 00 00 08 00 08 08 04 00 5D
8DE0: 10 08 04 02 04 08 10 00 07
8DE8: 00 00 3E 00 3E 00 00 00 BD
8DF0: 04 08 10 20 10 08 04 00 BC
8DF8: 1C 22 10 08 08 00 08 00 7D
8E00: 1C 22 2A 3A 1A 02 3C 00 ED
8E08: 08 14 22 22 3E 22 22 00 53
8E10: 1E 22 22 1E 22 22 1E 00 C0
8E18: 1C 22 02 02 02 22 1C 00 FC
8E20: 1E 22 22 22 22 22 1E 00 11
8E28: 3E 02 02 1E 02 02 3E 00 9B
8E30: 3E 02 02 1E 02 02 02 00 2B
8E38: 3C 02 02 02 32 22 3C 00 E6
8E40: 22 22 22 3E 22 22 22 00 FC
8E48: 1C 08 08 08 08 08 1C 00 8F
8E50: 20 20 20 20 20 22 1C 00 4D
8E58: 22 12 0A 06 0A 12 22 00 89
8E60: 02 02 02 02 02 02 3E 00 F3
8E68: 22 36 2A 2A 22 22 22 00 E9
```

```
8E70: 22 22 26 2A 32 22 22 00 EC
8E78: 1C 22 22 22 22 22 1C 00 64
8E80: 1E 22 22 1E 02 02 02 00 77
8E88: 1C 22 22 22 2A 12 2C 00 94
8E90: 1E 22 22 1E 0A 12 22 00 48
8E98: 1C 22 02 1C 20 22 1C 00 10
8EA0: 3E 08 08 08 08 08 08 00 D0
8EA8: 22 22 22 22 22 22 1C 00 97
8EB0: 22 22 22 22 22 14 08 00 3F
8EB8: 22 22 22 2A 2A 36 22 00 C4
8EC0: 22 22 14 08 14 22 22 00 E7
8EC8: 22 22 14 08 08 08 08 00 F2
8ED0: 3E 20 10 08 04 02 3E 00 3C
8ED8: 3E 06 06 06 06 06 3E 00 7C
8EE0: 00 02 04 08 10 20 00 00 80
8EE8: 3E 30 30 30 30 30 3E 00 F8
8EF0: 00 00 08 14 22 00 00 00 61
8EF8: 00 00 00 00 00 00 00 00 7F 95
8F00: 04 08 10 08 00 00 00 00 25
8F08: 00 00 1C 20 3C 22 3C 00 8F
8F10: 02 02 1E 22 22 22 1E 00 6C
8F18: 00 00 3C 02 02 02 3C 00 6F
8F20: 20 20 3C 22 22 22 3C 00 13
8F28: 00 00 1C 22 3E 02 3C 00 5F
8F30: 18 24 04 1E 04 04 04 00 FE
8F38: 00 00 1C 22 22 3C 20 1C 5B
8F40: 02 02 1E 22 22 22 22 00 A4
8F48: 08 00 0C 08 08 08 1C 00 06
8F50: 10 00 18 10 10 10 12 0C 6C
8F58: 02 02 22 12 0E 12 22 00 5B
8F60: 0C 08 08 08 08 08 1C 00 A1
8F68: 00 00 36 2A 2A 2A 22 00 2F
8F70: 00 00 1E 22 22 22 22 00 53
8F78: 00 00 1C 22 22 22 1C 00 0F
8F80: 00 00 1E 22 22 1E 02 02 15
8F88: 00 00 3C 22 22 3C 20 20 B3
8F90: 00 00 3A 06 02 02 02 00 73
8F98: 00 00 3C 02 1C 20 1E 00 FC
8FA0: 04 04 1E 04 04 24 18 00 A7
8FAB: 00 00 22 22 22 32 2C 00 60
8FBB: 00 00 22 22 22 14 08 00 A7
8FBB: 00 00 22 22 2A 2A 36 00 A4
8FCC: 00 00 22 14 08 14 22 00 3A
8FCC: 00 00 22 22 22 3C 20 1C AC
8FD0: 00 00 3E 10 08 04 3E 00 85
8FD8: 38 0C 0C 06 0C 0C 38 00 F9
8FE0: 08 08 08 08 08 08 08 00 FF
8FE8: 0E 18 18 30 18 18 0E 00 58
8FF0: 2C 1A 00 00 00 00 00 00 AC
8FF8: 00 2A 14 2A 14 2A 00 00 11
```

# DOS Adjust

Vincent D. O'Connor

*Tired of DOS 3.3's quirks? This utility lets anyone—programmers and nonprogrammers alike—easily customize DOS 3.3. For all Apple II computers. DOS 3.3 required.*

Despite the introduction of ProDOS, DOS 3.3 is still a popular and useful operating system for Apple II computers. But that doesn't mean it's perfect.

In fact, there are several "improved" versions of DOS 3.3 on the market. Perhaps you even have your own ideas about how DOS could be bettered. Unfortunately, altering the operating system (which is what DOS 3.3 is) has always required an intimate knowledge of how it works and at least some familiarity with assembly language programming—until now.

"DOS Adjust" is a program that lets you customize DOS 3.3 to your own tastes. You don't have to know how it works or even anything about assembly language programming. Simply run the program, make the changes you desire, exit the program, and format a blank disk. That disk will then have the altered DOS.

## In BASIC

DOS Adjust is a BASIC program, so typing it in is relatively easy. The process becomes mistake-free if you use the "Apple Automatic Proofreader," our error-checking program found elsewhere in this issue.

Type in DOS Adjust and save at least two copies to disk. Load and run it by entering

**RUN filename**

where *filename* is the name you used when you saved the program.

When you run DOS Adjust, a main menu appears listing five options:

1. CHANGE CATALOG DISPLAY
2. CHANGE COMMAND SYNTAX
3. SAVE LANGUAGE ON CARD
4. RETURN DOS 3.3 TO NORMAL
5. END

DOS Adjust lets you change the way the CATALOG command displays filenames and information on disks, change the command syntax and use your own commands, keep the loading of DOS on a warm boot from destroying the language on the language card, cancel any changes you've made to DOS and return it to normal, or end the program. Let's look at each option.

## Changing CATALOG

Option 1 allows you to alter the way the CATALOG command shows filenames and other disk information. All total, there are seven changes you can make to this command through DOS Adjust.

**Cancel full-screen CATALOG stop.** When you select this change, filenames are displayed and scrolled off the top of the screen until all have been listed.

**Change display filename length.** The second change alters the filename length displayed by the CATALOG command. Under DOS 3.3, a filename can be up to 30 characters long. Sometimes, however, you don't want long filenames

to appear on the screen. This selection lets you decide how many characters you want to appear. It does *not* change the actual filenames or their actual lengths—just how they're displayed. *Don't shorten the length displayed by too much, or you might have trouble telling similarly named files apart.*

**Remove volume number display.** The third change prevents the disk volume number from being displayed.

**Remove DISK VOLUME header.** This alteration prevents the DISK VOLUME header from appearing on the screen. The disk volume number still displays, but the words DISK VOLUME do not.

**Display deleted filenames.** The fifth selection lets you view filenames of previously deleted files. They show on the screen with a reverse character to the far right of the deleted filename. Remember, though, that deleted filenames are overwritten by new saves—the deleted filenames will appear only until new information is saved to disk. If there are several deleted files, they'll be replaced one at a time by saves of new files.

**Wait after each filename.** Choosing the sixth change alters the CATALOG command so that the information is displayed one line at a time. You must press a key to see another line. This allows you to view files one at a time; it's especially useful when you have stored a number of files or programs under quite similar names, or when there are a large number of files on the disk.

**Return to main menu.** Press the 7 key to return to the first DOS Adjust menu.

## A Different Syntax

The second option on the main menu gives you a way to change DOS 3.3's command syntax. You don't like the SAVE command? Rather use KEEP instead? This option lets you do it. You can change any or all DOS commands, with only one catch: The new name must be the same length as the old name. You can't change the INIT command to RUDOLPH, for example.

Select this option and press the 2 key at the main menu, and the 28 DOS commands will appear at the top of the screen. In the middle is the message

COMMAND TO BE CHANGED:

Type in the command, press Return, and  
NEW COMMAND NAME:

appears. Enter a new name (the exact length of the old name) and press Return. RUN could be changed to ZIP, LOAD to INTO, or CATALOG to LISTNOW.

## Keep The Language

The third option corrects what some consider a problem in DOS 3.3. If you have an Apple II+, you probably have a language card installed. (The Apple IIe and IIc have the equivalent of a language card built in.)

When you boot DOS 3.3, it loads the language card with the appropriate language. However, whenever it's booted, DOS also clears the language card of whatever language is in it. This is done as a safeguard, but it means that you can't load the language card from one disk, then boot a second disk that uses the language. Selecting this option removes this problem, as long as the second disk contains an altered copy of DOS 3.3.

## Back To Normal

The last main menu option returns DOS 3.3 to its original state. All changes are canceled, and everything works as normal.

## Be Sure To Save

Once you're satisfied with the changes you've made to DOS 3.3, exit DOS Adjust. To save this modified DOS, insert a blank, unformatted disk in the drive (*do not turn the power off*) and type

NEW <Return>

10 HOME <Return> (or LOAD your favorite hello program from another disk)

INIT HELLO <Return>

This disk now carries the altered DOS. You can place your customized DOS on as many disks as you want.

## DOS Adjust

*Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.*

```
70 5 GOSUB 8000: REM INITIALIZE VARIABLES
E8 40 HOME :T = 1:L = 1:B = 22:R = 39: GO
    SUB 8050
71 45 N = 5:T$ = "OPTIONS":LL$ = "1":HH$
    = "5": VTAB 3
E5 50 CH$(1) = "CHANGE CATALOG DISPLAY":C
    H$(2) = "CHANGE COMMAND SYNTAX":CH$
    (3) = "SAVE LANGUAGE ON CARD"
36 55 CH$(4) = "RETURN DOS 3.3 TO NORMAL"
    :CH$(5) = "END"
52 60 GOSUB 8150: GOSUB 8100
44 65 OP = VAL (A$): ON OP GOSUB 1000,200
    0,3000,4000,5000
83 70 GOTO 40
88 997 REM
22 998 REM    CHANGE CATALOG DISPLAY
C8 999 REM
A6 1000 HOME :T = 1:L = 1:B = 22:R = 39:
    GOSUB 8050
51 1005 N = 7:T$ = "OPTIONS":LL$ = "1":HH
    $ = "7": VTAB 3
84 1010 CH$(1) = "CANCEL FULL SCREEN CATA
```



```

LOG STOP":CH$(2) = "CHANGE DISPLA
Y FILENAME LENGTH":CH$(3) = "REMO
VE VOLUME NUMBER DISPLAY"
3F 1015 CH$(4) = "REMOVE 'DISK VOLUME' HE
ADER":CH$(5) = "DISPLAY DELETED F
ILENAMES":CH$(6) = "WAIT AFTER EA
CH FILENAME"
F1 1020 CH$(7) = "RETURN TO MAIN MENU"
74 1025 GOSUB 8150: GOSUB 8100
B0 1030 OP = VAL (A$): ON OP GOSUB 1100,1
200,1300,1400,1500,1600,1700
38 1035 IF OP = 7 THEN RETURN
5A 1040 GOTO 1000
11 1097 REM
77 1098 REM END FULL SCREEN CATALOG STO
P
21 1099 REM
26 1100 HOME : VTAB 12:T$ = "MAKING ALTER
ATION": GOSUB 8200
31 1105 FOR I = 44596 TO 44598: POKE I,NP
%: NEXT I
7C 1110 GOSUB 8300: RETURN
13 1197 REM
0D 1198 REM CHANGE FILENAME LENGTH
23 1199 REM
15 1200 HOME : VTAB 12
8C 1205 INPUT "ENTER NEW DISPLAY LENGTH:
":NL
2C 1210 HOME : VTAB 12:T$ = "MAKING ALTER
ATION": GOSUB 8200
4F 1215 POKE 44567,NL - 1
82 1220 GOSUB 8300: RETURN
15 1297 REM
AF 1298 REM REMOVE VOLUME # DISPLAY
25 1299 REM
2A 1300 HOME : VTAB 12:T$ = "MAKING ALTER
ATION": GOSUB 8200
EF 1305 FOR I = 44480 TO 44482: POKE I,NP
%: NEXT I
00 1310 GOSUB 8300: RETURN
17 1397 REM
82 1398 REM REMOVE 'DISK VOLUME' HEADER
27 1399 REM
2C 1400 HOME : VTAB 12:T$ = "MAKING ALTER
ATION": GOSUB 8200
13 1405 FOR I = 44467 TO 44469: POKE I,NP
%: NEXT I
82 1410 GOSUB 8300: RETURN
19 1497 REM
91 1498 REM DISPLAY DELETED FILENAMES
29 1499 REM
2E 1500 HOME : VTAB 12:T$ = "MAKING ALTER
ATION": GOSUB 8200
93 1505 POKE 44505,NP%: POKE 44506,NP%
84 1510 GOSUB 8300: RETURN
18 1597 REM
89 1598 REM WAIT AFTER EACH FILENAME
28 1599 REM
30 1600 HOME : VTAB 12:T$ = "MAKING ALTER
ATION": GOSUB 8200
07 1605 POKE 44599,NP%: POKE 44600,NP%
86 1610 GOSUB 8300: RETURN
1D 1697 REM
F8 1698 REM RETURN TO MAIN MENU
2D 1699 REM
0F 1700 RETURN
85 2000 HOME : VTAB 2
EE 2005 FOR I = 1 TO 28: PRINT C$(I),: NE
XT I
36 2010 PRINT : PRINT L$: PRINT : PRINT
63 2015 INPUT "COMMAND TO BE CHANGED: ":C
M$

```

```

83 2020 PRINT : INPUT "NEW COMMAND NAME:
":NC$
C1 2025 FOR I = 1 TO 28
50 2030 IF CM$ = C$(I) THEN PT = I: GOTO
2055
A0 2035 NEXT I
9C 2040 PRINT : PRINT BP$:CM$;" IS NOT A
DOS 3.3 COMMAND": PRINT "PRESS <R
ETURN> TO TRY AGAIN";
1C 2045 GET A$: IF A$ < > CHR$ (13) THEN
2045
60 2050 GOTO 2000
AC 2055 IF LEN (CM$) = LEN (NC$) THEN 208
0
A5 2060 PRINT : PRINT BP$;"THE NEW COMMAN
D MUST BE THE SAME": PRINT "LENGT
H AS THE OLD COMMAND"
6B 2065 PRINT : PRINT "PRESS <RETURN> TO
CONTINUE";
3E 2070 GET A$: IF A$ < > CHR$ (13) THEN
2070
90 2075 GOTO 2000
4D 2080 J = 1
5E 2085 FOR I = SA(PT) TO SA(PT) + LEN (C
M$) - 2
8E 2090 POKE I, ASC ( MID$ (NC$,J,J))
FD 2095 IF J < LEN (NC$) THEN J = J + 1
6E 2100 NEXT I
8E 2105 POKE I, ASC ( MID$ (NC$,J,J)) + 1
28
2D 2110 HOME : VTAB 12:T$ = "MAKING ALTER
ATION": GOSUB 8200
A5 2115 GOSUB 8300: RETURN
1A 2185 DATA INIT,LOAD,SAVE,RUN,CHAIN,DEL
ETE,LOCK,UNLOCK,CLOSE
FB 2190 DATA READ,EXEC,WRITE,POSITION,OPE
N,APPEND,RENAME,CATALOG,MON
61 2195 DATA NOMON,PR#,IN#,MAXFILES,FP,IN
T,BSAVE,BLOAD,BRUN,VERIFY
20 2200 DATA 43140,43144,43148,43152,4315
5,43160,43166,43170,43176,43181,4
3185,43189,43194,43202,43206
7E 2205 DATA 43212,43218,43225,43228,4323
3,43236,43239,43247,43249,43252,4
3257,43262,43266
26 3000 HOME : VTAB 12:T$ = "MAKING ALTER
ATION": GOSUB 8200
76 3005 FOR I = 49107 TO 49109: POKE I,NP
%: NEXT I
7C 3010 GOSUB 8300: RETURN
C7 4000 HOME :T$ = "RETURNING DOS TO NORM
AL": VTAB 12: GOSUB 8200
A6 4005 POKE 44467,32: POKE 44468,237: PO
KE 44469,253
DD 4010 POKE 44480,32: POKE 44481,66: POK
E 44482,174
0B 4015 POKE 44505,48: POKE 44506,74: POK
E 44567,29
AD 4020 POKE 44596,206: POKE 44597,157: P
OKE 44598,179
1D 4025 POKE 44599,208: POKE 44600,8
AE 4030 POKE 49107,141: POKE 49108,0: POK
E 49109,224
38 4035 FOR I = 43140 TO 43271: POKE I,A(
I - K): NEXT I
E4 4040 RETURN
43 4050 DATA 73,78,73,212,76,79,65,196,83
,65,86,197,82,85,206
34 4055 DATA 67,72,65,73,206,68,69,76,69,
84,197,76,79,67,203
EB 4060 DATA 85,78,76,79,67,203,67,76,79,

```

```

83,197,82,69,65,196
AD 4065 DATA 69,88,69,195,87,82,73,84,197
,80,79,83,73,84,73,79,206
44 4070 DATA 79,80,69,206,65,80,80,69,78,
196,82,69,78,65,77,197
31 4075 DATA 67,65,84,65,76,79,199,77,79,
206,78,79,77,79,206
CD 4080 DATA 80,82,163,73,78,163,77,65,88
,70,73,76,69,211
54 4085 DATA 70,208,73,78,212,66,83,65,86
,197,66,76,79,65,196
82 4090 DATA 66,82,85,206,86,69,82,73,70,
217
26 4997 REM
37 4998 REM EXIT PROGRAM
36 4999 REM
58 5000 T = 16:L = 4:B = 21:R = 37: GOSUB
8050
FB 5005 VTAB 18:T$ = "ARE YOU SURE (Y/N)?
"
09 5010 HTAB ((41 - LEN (T$)) / 2): PRINT
T$;
33 5012 PRINT BP$;
88 5015 PRINT : PRINT : T$ = "CHOICE=>"
00 5020 HTAB ((41 - LEN (T$)) / 2): PRINT
T$;
7F 5025 GET A$
A5 5030 IF A$ < > "Y" AND A$ < > "N" THEN
5030
9D 5035 PRINT A$;
DF 5040 GET B$
35 5045 IF B$ = CHR$ (13) THEN 5060
43 5050 IF B$ < > CHR$ (8) THEN 5040
AB 5055 PRINT CHR$ (8); " "; CHR$ (8);: GO
TO 5025
58 5060 IF A$ = "N" THEN 40
24 5065 HOME : END
29 7997 REM
1A 7998 REM INITIALIZE VARIABLES
39 7999 REM
80 8000 D$ = CHR$ (4):BP$ = CHR$ (7):NP$
= 234:SD$ = "I"
81 8005 FOR I = 1 TO 40:L$ = L$ + "_": NE
XT I
53 8010 K = 43139: DIM A(132): DIM C$(28)
: DIM SA(28)
89 8015 FOR I = 1 TO 28: READ C$(I): NEXT
I
E7 8020 FOR I = 1 TO 28: READ SA(I): NEXT
I
E1 8025 FOR I = 1 TO 132: READ A(I): NEXT
I
E4 8030 RETURN
04 8047 REM
4A 8048 REM DRAW WINDOW
14 8049 REM
72 8050 VTAB T: HTAB L + 1: PRINT LEFT$ (
L$,R - L - 1);
E5 8055 FOR I = T + 1 TO B: VTAB I: HTAB
L: PRINT SD$;: HTAB R: PRINT SD$:
NEXT I
64 8060 VTAB B: HTAB L + 1: PRINT LEFT$ (
L$,R - L - 1);
19 8065 RETURN
18 8077 REM
02 8078 REM GET CHOICE
28 8079 REM
91 8100 PRINT : PRINT : T$ = "CHOICE=>"
32 8105 HTAB ((41 - LEN (T$)) / 2): PRINT
T$;
58 8110 GET A$

```

```

D1 8115 IF A$ < LL$ OR A$ > HH$ THEN 8110
76 8120 PRINT A$;
05 8125 GET B$
00 8130 IF B$ = CHR$ (13) THEN RETURN
00 8135 IF B$ < > CHR$ (8) THEN 8125
36 8140 PRINT CHR$ (8); " "; CHR$ (8);: GO
TO 8110
06 8147 REM
F2 8148 REM PRINT MENU
16 8149 REM
5E 8150 GOSUB 8200
0F 8155 LN = 0
38 8160 FOR I = 1 TO N:LN = LN + LEN (CH$
(I)) + 3: NEXT I
A3 8165 LN = LN / N:H = (41 - LN) / 2:V =
(24 - N) / 2
31 8170 VTAB V
A6 8175 FOR I = 1 TO N: HTAB (H): PRINT S
TR$ (I);"."CH$(I): NEXT I
FA 8180 RETURN
1A 8197 REM
3F 8198 REM CENTERING ROUTINE
2A 8199 REM
50 8200 HTAB ((41 - LEN (T$)) / 2): PRINT
T$
05 8205 RETURN
1C 8297 REM
BB 8298 REM DELAY
2C 8299 REM
18 8300 FOR J = 1 TO 800: NEXT J
07 8305 RETURN

```

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C.O.D.

# High Rise

Charles McGuyer

*Apple version by Tim Victor, Editorial Programmer*

*You're a construction worker, trapped in a partially completed high-rise building after dark. Can you make it safely to the ground floor without being zapped by the patrol robot? This unique game, written entirely in machine language, is one of the best Apple arcade-style games we've ever published. Works with DOS 3.3 or ProDOS.*

The time is the not-too-distant future. The place is a downtown high-rise building under construction. You're just finishing the day's work when you realize it's already dark. Everyone else has gone home, leaving you alone in a shadowy, multi-story maze of naked girders and bare concrete. A chill creeps down your spine as you think about the recently installed antitheft robot. It patrols the structure from dusk to dawn, automatically disposing of any intruder.

Your only hope is to use the temporary elevators. They move randomly during the night hours, going up and down, stopping at some floors, skipping others. With skill and a little luck, you just might evade the dangers around you and make it safely to the ground floor—but it won't be a cakewalk.

"High Rise" must be entered with the "Apple MLX" machine language entry program found elsewhere in this issue. Since High Rise loads into the memory area normally used by BASIC programs, to type High Rise, you must relocate the start of BASIC memory *before* loading MLX. To do this, enter the following line in direct mode (without a line number) and press Return:

**POKE 104,28: POKE 7168,0: NEW**

Next, load and run MLX. Follow the MLX instructions carefully, using these addresses:

**Starting address: 0801**

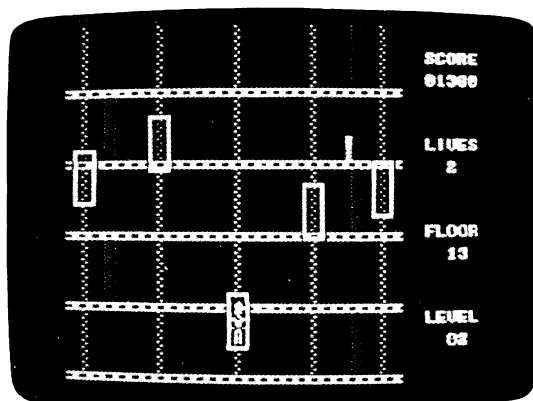
**Ending address: 1BD8**

After you've finished typing High Rise, save at least one copy on disk. Once that's done, you can activate High Rise by typing **BRUN filename** (substituting your own filename, of course).

## Run Away

The object of High Rise is to make your way to the ground floor via the elevators while evading the patrol robot. When the game begins, you'll see several floors of the building and a number of elevators moving up and down. Move your player with keyboard controls: Press the left-arrow key to move left, the right-arrow key to move right, and the space bar to stop.

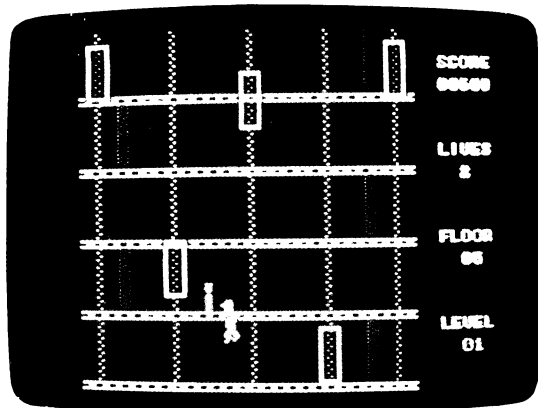
You can jump on any elevator that comes to your floor (move into the elevator and it picks you up automatically), but there's no way to control its direction or how far it goes. These are just temporary elevators, used to transport materials and workers during daytime hours. The trick is to catch one that's moving in the



*Going down? Your construction worker character is putting distance between himself and the patrol robot two floors above.*

direction you want and get off to catch another before it starts moving in the wrong direction.

When you reach the lowest floor shown, the screen scrolls up one floor, revealing the next lower level. Once you reach ground floor, the player sprints off the screen to safety and you can play another game.



*Eeeeeee! You've just been shoved off the building by the patrol robot. Don't worry, though—you've got two lives left.*

The patrol robot always starts on an upper floor and moves systematically through the building, traveling up and down through special shafts that are closed to you. Designed to discourage theft and vandalism, the robot's technique is simple and effective: It pushes any intruders (including you) off the building. If it runs into an elevator and detects you inside, it sends a high-voltage charge through the elevator shell until you drop.

When boarding an elevator, make sure that your player is positioned exactly in the center of the elevator shaft (the double-dotted lines). If you're just a bit to one side, the elevator will not pick you up.

When the game begins, you have three players. Each time you get zapped or fall from the building, you lose a player. Play ends when all three have been lost. When the game starts, you're on the twelfth floor. Moving down a level earns you 100 points. If you reach the bottom safely, you'll have another chance to play, beginning at a higher floor. High Rise keeps track of the highest score attained in the current session, as well as your score in the current game.

## High Rise

*For mistake-proof program entry, use "Apple MLX," found elsewhere in the issue, to type in this program.*

```
0801: A9 00 85 EC A9 80 85 ED AD
0809: 20 DC 13 20 A4 1B 20 6F 06
0811: 17 A9 20 85 E6 8D E0 1B BD
0819: A9 00 8D D7 1B 8D D6 1B 05
0821: A9 2B 8D DD 1B A9 C0 8D 2E
```

```
0829: DE 1B 20 C7 15 A9 40 85 45
0831: E6 20 C7 15 A9 00 8D FE 6E
0839: 1B 8D FF 1B 2C 57 C0 2C 58
0841: 52 C0 2C 54 C0 2C 50 C0 8D
0849: A9 70 8D F8 1B A9 0E 8D B4
0851: F9 1B A9 C4 8D FA 1B A9 DE
0859: 0E 8D FB 1B A9 00 8D 74 E1
0861: 0E 8D 81 0E 8D 8E 0E 8D 3D
0869: 9B 0E 8D A4 0E 8D B1 0E DE
0871: 8D BB 0E 8D C8 0E 8D F6 62
0879: 1B A9 0A 8D F4 1B A9 00 03
0881: 8D F3 1B A9 05 8D 9E 0E FC
0889: A9 02 8D 84 0E 8D 85 0E AB
0891: 8D 86 0E AD F6 1B F0 03 AF
0899: 4C 10 0A A9 01 8D E3 1B D0
08A1: A9 01 8D E2 1B A9 00 8D B3
08A9: E4 1B A9 56 8D E5 1B A9 71
08B1: 00 8D E6 1B A9 00 8D E7 04
08B9: 1B A9 01 8D EC 1B A9 00 E1
08C1: 8D ED 1B 8D EA 1B A9 13 7A
08C9: 8D EE 1B A9 00 8D F1 1B 8F
08D1: A9 06 8D EF 1B A9 00 8D F5
08D9: F0 1B AD F3 1B AC F4 1B AE
08E1: 8C F3 1B 6A 90 0D EE F3 C9
08E9: 1B A9 7C 8D E5 1B A9 39 82
08F1: 8D EE 1B A9 FF 8D E9 1B A7
08F9: A9 00 8D F7 1B 20 A4 14 C6
0901: 20 3C 0D 20 45 0C 20 81 F1
0909: 0D 20 61 1A 20 5A 17 20 30
0911: 33 09 20 C0 09 20 A4 14 35
0919: 20 6D 15 20 B1 19 20 A7 15
0921: 0B 20 09 0B 20 BD 0A 20 BE
0929: 7B 0A AD F7 1B F0 CE 4C 37
0931: 94 08 AD E5 1B A0 C0 C9 C8
0939: A2 B0 06 69 26 C8 4C 38 45
0941: 09 9B 18 6D F3 1B CD E8 68
0949: 1B F0 73 8D E8 1B A2 02 67
0951: 8E B4 0E C9 0A 90 08 EE C7
0959: B4 0E E9 0A 4C 54 09 69 56
0961: 02 8D B5 0E A9 00 8D B1 89
0969: 0E 9B D0 52 A2 02 FE 84 87
0971: 0E BD 84 0E C9 0C D0 08 93
0979: A9 02 9D 84 0E CA 10 EE 87
0981: A9 00 8D 81 0E 20 35 1B AB
0989: AD F3 1B D0 2B 20 05 0E D1
0991: AD F4 1B 18 69 04 8D F4 08
0999: 1B EE CC 0E AD CC 0E C9 F5
09A1: 0C D0 0B A9 02 8D CC 0E 77
09A9: EE CB 0E A9 00 8D CB 0E 58
09B1: A9 01 8D F7 1B 4C 01 0A 20
09B9: CE F3 1B 20 EA 15 60 AD AF
09C1: E5 1B 38 ED EE 1B C9 08 F2
09C9: 10 35 C9 EE 30 31 AD E6 E1
09D1: 1B 38 ED EF 1B C9 02 10 50
09D9: 26 C9 FF 30 22 20 47 1B AF
09E1: 20 CA 0D A9 01 8D F7 1B 3C
09E9: CE 9E 0E A9 00 8D 9B 0E E2
09F1: A9 02 CD 9E 0E D0 05 A9 64
09F9: 01 8D F6 1B 20 01 0A 60 F9
0A01: A9 1B 8D 0F 0A 20 60 0A 2E
0A09: CE 0F 0A D0 F8 60 00 A9 89
0A11: 0A A0 49 20 FC 1A A9 80 A1
0A19: 8D 4D 0A 20 60 0A 2C 10 1E
0A21: C0 AD 00 C0 10 FB 2C 10 E5
0A29: C0 C9 CE F0 12 C9 EE F0 7F
0A31: 0E A9 40 8D 4D 0A 20 60 CA
0A39: 0A 20 60 0A 4C 0F 08 2C E1
0A41: 54 C0 2C 51 C0 4C D0 03 26
0A49: 20 2E 20 53 2E 34 07 1B 9D
0A51: 1D 10 1E 1E 01 19 01 1F 2B
```



0A59: 1A 01 1C 20 14 1F 00 20 7D  
 0A61: A4 14 20 6D 15 20 B1 19 4D  
 0A69: 20 A7 0B 20 A4 14 20 3C CC  
 0A71: 0D 20 81 0D 20 61 1A 4C 1C  
 0A79: 5A 17 AD E2 1B F0 36 10 7D  
 0A81: 1B AD E6 1B D0 07 AD E7 03  
 0A89: 1B C9 02 90 29 AD E7 1B D1  
 0A91: 38 E9 02 B0 1D 69 07 CE F2  
 0A99: E6 1B 10 16 AD E6 1B C9 54  
 0AA1: 1C B0 13 AD E7 1B 18 69 72  
 0AA9: 02 C9 07 90 05 EE E6 1B E7  
 0AB1: E9 07 8D E7 1B 60 A9 00 5A  
 0AB9: 8D E2 1B 60 2C E9 1B 30 26  
 0AC1: 0D AD E5 1B 18 69 1C 38 0D  
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0C89: FB 4C 97 0C 69 DC 85 FA 2B  
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 17F9: 18 EE FC 1B 4C E1 17 4C A5  
 1801: 5E 18 20 EC 16 A0 00 B9 26  
 1809: 4F 18 91 FE C8 C0 02 D0 27  
 1811: F6 4C 24 18 20 EC 16 A0 57  
 1819: 00 B9 51 18 91 FE C8 C0 3E  
 1821: 08 D0 F6 A5 FE A6 FF 85 DA  
 1829: FC 86 FD 98 18 65 FE 85 9C  
 1831: FE A0 00 B1 FC 91 FE C8 19  
 1839: 98 18 65 FE 29 7F C9 1E 51  
 1841: F0 08 C9 46 F0 04 C9 6E 23  
 1849: D0 E9 EE DA 1B 60 D5 AA 98  
 1851: D0 A0 C1 82 85 BA 94 A8 9A  
 1859: 22 48 6E 94 BA A9 19 8D FF  
 1861: D6 1B A9 00 8D FC 1B 8D 1D  
 1869: DA 1B AC FC 1B C0 05 F0 0A  
 1871: 1B 20 92 18 38 A9 1C ED 99  
 1879: D6 1B 8D D6 1B 18 AD DA 6A  
 1881: 1B 69 06 8D DA 1B EE FC 51  
 1889: 1B 4C 68 18 60 84 82 D0 34  
 1891: 80 A2 00 A9 8E 85 FC A9 73  
 1899: 18 85 FD A9 01 8D DE 1B A8  
 18A1: 20 EC 16 A0 01 B1 FC 91 44  
 18A9: FE 88 10 F9 18 A5 FC 69 D7  
 18B1: 02 85 FC 90 02 E6 FD EE 83  
 18B9: DA 1B CE DE 1B 10 E1 E8 AB  
 18C1: E0 10 D0 CF 60 AD E1 1B 16  
 18C9: 0A 0A 38 6D E1 1B 8D E1 D7  
 18D1: 1B 60 80 BC 98 BC BC B0 65  
 18D9: FE BC FE BC BC FC BE BC 78  
 18E1: BE FE FE BC EC 98 E0 E6 1F  
 18E9: 86 E6 BE BC BE BC BE BC DD  
 18F1: FE E6 E6 E6 E6 E6 FE 80 F7  
 18F9: E6 9C E6 E6 88 86 86 E0 DD  
 1901: E6 E6 E6 E6 E6 E6 86 86 12  
 1909: E6 E6 98 E0 E6 86 FE E6 BF  
 1911: E6 E6 E6 E6 E6 98 E6 E6 0A  
 1919: E6 E6 E6 B0 80 F6 98 B0 22  
 1921: B0 B4 BE BE B0 BC E6 E6 C9  
 1929: E6 86 E6 86 86 86 E6 98 6A  
 1931: E0 B6 86 E6 E6 E6 E6 E6 48  
 1939: E6 8C 98 E6 E6 E6 E6 E6 0B  
 1941: 98 80 EE 98 BC E0 FE E0 0E  
 1949: E6 98 E6 FC FE BE 86 E6 A8  
 1951: BE BE F6 FE 98 E0 9E 86 6D  
 1959: E6 E6 E6 BE E6 BE B0 98 AD  
 1961: E6 E6 E6 BC BC 8C 80 E6 69  
 1969: 98 E6 E6 B0 E6 E6 8C E6 5C  
 1971: B0 E6 E6 E6 E6 86 86 E6 46  
 1979: E6 98 E6 E6 86 E6 E6 E6 15  
 1981: 86 B6 E6 E6 98 E6 E6 FE 1D  
 1989: E6 98 86 80 BC BC FE BC C1  
 1991: B0 BC BC 8C BC 98 E6 FE C0  
 1999: BE BE FE 86 BE E6 98 BC A2  
 19A1: E6 FE E6 E6 BC 86 EC E6 13

19A9: BE 98 BE 98 E6 E6 98 FE C5  
 19B1: AD F8 1B 85 EE AD F9 1B F1  
 19B9: 85 EF A5 EE 05 EF D0 01 D8  
 19C1: 60 A0 04 A9 01 AE FD 1B 41  
 19C9: F0 01 0A 31 EE F0 4B B1 8C  
 19D1: EE 30 05 2C 34 1B F0 4D 28  
 19D9: C8 B1 EE 8D DA 1B C8 B1 1A  
 19E1: EE 8D D6 1B A5 EE 18 69 FD  
 19E9: 07 85 FC A5 EF 69 00 85 A5  
 19F1: FD A9 06 8D DF 1B 20 EC BF  
 19F9: 16 A0 00 B1 1C 91 FE C8 68  
 1A01: B1 FC D0 F7 EE DA 1B CE CE  
 1A09: DF 1B D0 EA A9 01 AE FD 69  
 1A11: 1B F0 01 0A A0 04 51 EE 76  
 1A19: 91 EE B1 EE 2C 34 1B F0 50  
 1A21: 04 29 03 F0 06 20 EF 1A 88  
 1A29: 4C BB 19 A0 02 B1 EE 85 D9  
 1A31: FC C8 B1 EE 85 FD 20 EF 8F  
 1A39: 1A A0 00 A5 EE 91 FC C8 7D  
 1A41: A5 EF 91 FC C8 05 EE D0 4F  
 1A49: 0B A5 FC 8D FA 1B A5 FD 72  
 1A51: 8D FB 1B 60 A5 FC 91 EE E7  
 1A59: C8 A5 FD 91 EE 4C BB 19 6D  
 1A61: AD F8 1B 85 EE AD F9 1B A3  
 1A69: 85 EF A5 EE 05 EF D0 01 8A  
 1A71: 60 A0 04 B1 EE 2C 34 1B 45  
 1A79: D0 6E C9 00 30 0C A9 01 F0  
 1A81: AE FD 1B F0 01 0A 31 EE 80  
 1A89: D0 5E C8 B1 EE 8D DA 1B 70  
 1A91: C8 B1 EE 8D D6 1B A9 D2 96  
 1A99: 8D BE 1A A9 18 8D BF 1A B2  
 1AA1: A9 06 8D DF 1B A5 EE 18 41  
 1AA9: 69 07 85 FC A5 EF 69 00 94  
 1AB1: 85 FD 20 EC 16 A0 00 B1 DF  
 1AB9: FC F0 09 AA 8D FF FF 91 F3  
 1AC1: FE C8 D0 F3 EE DA 1B AD C7  
 1AC9: BE 1A 18 69 25 8D BE 1A 74  
 1AD1: 00 03 EE BF 1A CE DF 1B CF  
 1AD9: D0 D8 A9 01 AE FD 1B F0 86  
 1AE1: 01 0A A0 04 11 EE 91 EE C3  
 1AE9: 20 EF 1A 4C 6B 1A A0 00 37  
 1AF1: B1 EE AA C8 B1 EE 86 EE E1  
 1AF9: 85 EF 60 48 98 48 AD FA 89  
 1B01: 1B 85 EE AD FB 1B 85 EF 26  
 1B09: A0 00 68 91 EE C8 68 91 B2  
 1B11: EE 20 EF 1A A9 00 A8 91 96  
 1B19: EE C8 91 EE C8 AD FA 1B 28  
 1B21: 91 EE C8 AD FB 1B 91 EE 2E  
 1B29: A5 EE 8D FA 1B A5 EF 8D 2C  
 1B31: FB 1B 60 40 A9 E8 8D 87 CF  
 1B39: 1B A9 F4 8D 7D 1B A9 1E A8  
 1B41: 8D 6A 1B 4C 56 1B A9 E0 54  
 1B49: 8D 87 1B A9 E8 8D 7D 1B 89  
 1B51: A9 1F 8D 6A 1B A9 01 8D 88  
 1B59: 00 1C A0 00 AD 87 1B 8D F9  
 1B61: 02 1C 4E 00 1C 90 0C B9 5E  
 1B69: 00 1E C8 8D 01 1C A9 80 65  
 1B71: 8D 00 1C 4E 01 1C 90 03 73  
 1B79: AD 30 C0 A2 FF E8 D0 FD 18  
 1B81: 90 03 AD 30 C0 A2 FF E8 F2  
 1B89: D0 FD EE 02 1C D0 D3 18 89  
 1B91: AD 87 1B E9 01 8D 87 1B EA  
 1B99: AD 7D 1B 69 01 8D 7D 1B 54  
 1BA1: 90 BA 60 A9 88 8D 00 1E 0E  
 1BA9: A0 01 B9 FF 1D 99 00 1E 15  
 1BB1: C8 D0 F7 A9 80 A0 03 99 40  
 1BB9: 00 1F 88 10 FA A9 AA A0 3E  
 1BC1: 03 99 04 1F 88 10 FA A0 6D  
 1BC9: 08 B9 F8 1E 99 00 1F C8 47  
 1BD1: D0 F7 60 A0 A0 A0 A0 ED



# Power Sketch

Shawn McCarthy

*One of the Apple computer's most attractive features is its ability to display high-resolution graphics. Producing those graphics, though, usually means you need expensive commercial software. This feature-packed program lets you sketch, color, and save hi-res drawings. For all Apple II computers using DOS 3.3 or ProDOS. Requires joystick.*

Let the amateur artist inside you take charge of your Apple computer with "Power Sketch," an impressive program that's versatile and fast. With Power Sketch you'll be drawing, filling, and coloring any number of hi-res screens. And if you have an Apple II+ or IIe, you can use "Hi-Res Poster Printer," another program included in this issue, to easily print your creations in giant sizes.

## Pictures Worth A Thousand Words

Type in Power Sketch by using the "Apple Automatic Proofreader," the error-checking utility you'll find elsewhere in the issue. Save at least one copy to disk.

Power Sketch is written in Applesoft BASIC, but some machine language (ML) is used to speed up the program. The ML is created in the BASIC program, so you don't have to know any ML programming to enter Power Sketch.

After you've saved the program to disk, type

**RUN filename**

where *filename* is the name you used to save Power Sketch to disk. The program's main menu appears. From this menu you can draw, fill, spray, brick, air brush, erase, use several DOS commands (including CATALOG, SAVE, and LOAD), and switch hi-res screens.

You need an Apple II+, IIe, or IIC computer with at least 48K of memory to use Power Sketch. No additional cards are necessary. Since Power Sketch uses color, a color monitor is desirable, though a monochrome monitor will produce the same graphic quality even without color.

## Pencil To Paper

Once you see the main menu on your screen, you have eight options to choose from. Each lets you do something totally different. To select one, just press the appropriate key. You don't need to hit the Return key to enter your choice.

**Draw Mode.** Use your joystick to create finely detailed pictures. Press and hold down button 0 as you move the joystick to draw in a selected color. Press and hold down button 1 to erase anything the tiny cursor passes over. Type the C key to select a new color. Type the S key to change the draw speed (from slow to fast, or fast to slow).

**Fill Mode.** Allows you to fill in selected areas of the graphics screen. Use the joystick to place the cursor in the right location. Press button 0 once. Three more points appear on the screen to create a four-point box. Stretch or contract the box by moving the joystick. Once the points are correctly placed, press button 0 again. Select the color or invert, and the filled box appears.

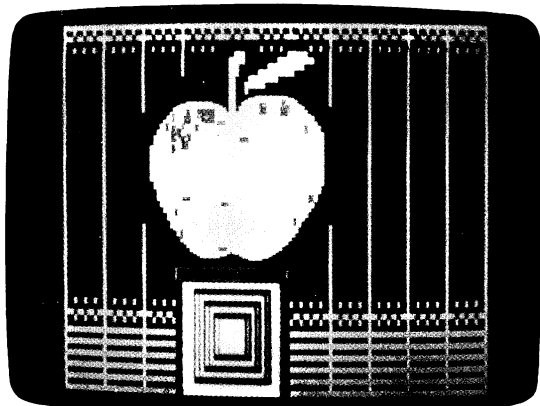
**Paint Mode.** Draws with a thick line. This mode is useful when you want to fill in irregular shapes. Use the same techniques as you used in the Draw Mode to draw, change color, or change speed.

**Brick Layer.** A useful mode for creating walls or abstract designs. You can brick out the screen in selected areas with bricks chosen

according to size. Use the same techniques you used in Fill Mode to select the area. After you've chosen a color, respond to the questions concerning brick size (width between 1 and 20; height between 1 and 10). Enter each size, press Return, and watch.

**Air Brush.** Air Brush simulates a real air brush. When in this mode, move the cursor around to spray dots, or keep it in one area to darken or create a fill. Press button 0 to spray. To switch colors, hit the C key. The air brush can create some really wild effects.

**Page Erase.** Automatically clears your screen to the color you select.



*"Power Sketch" offers an impressive array of hi-res drawing tools that help you create dazzling graphics on your Apple II computer.*

**DOS Commands.** Using DOS, you can load, save, and copy your graphics screens. You can also list a directory (catalog) of your disk to search for screens you may have created and saved earlier.

**LOAD.** Loads a graphics file from disk onto a specific graphics page in memory.

**SAVE.** Saves a graphics page in memory to a disk file.

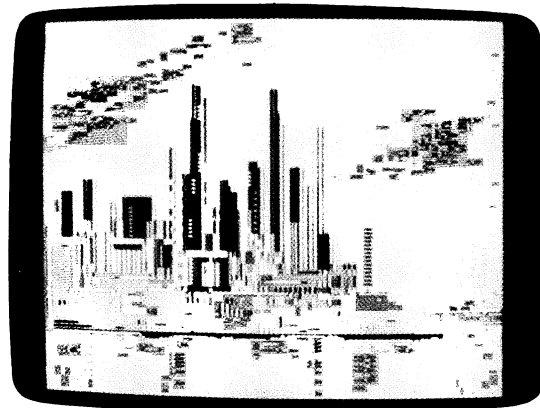
**COPY.** Copies a file from one disk to another by loading that screen into memory at location 24576 (\$6000 in hexadecimal), then saving it to disk.

**CATALOG.** Lists all present files on disk.

**EXIT.** Returns to the main menu.

**Switch Screens.** Allows all functions to operate on the other hi-res graphics page. You have access to two pages. The current page in use is listed at the top right of the main menu.

You can return to the main menu at any time, from within any of these modes, simply by pressing the Esc (Escape) key.



*The fill, airbrush, and drawing tools in "Power Sketch" were put to excellent use in this painting of a city skyline.*

## Draw And Insert

The graphics screens you create using Power Sketch can be saved and used in your own BASIC programs. To use the screens, load them from disk by inserting the following information in your program:

1. Enter hi-res mode with an **HGR** statement.
2. Create a line like

**BLOAD Screen Filename,A\$2000** (for graphics page 1)

3. To see full-screen graphics, use **POKE -16302,0**.

This short program is an example of loading a graphics screen into page 1. Press any key to return to the normal TEXT screen. (Just use lines 10-30 in your own program to load the screen.)

```
10 HGR
20 POKE -16302,0
30 PRINT CHR$(4);"BLOAD NAME,A$2000"
40 GET A$
50 TEXT
60 END
```

The next routine loads a graphics screen into page 2.

```
10 HGR2
20 PRINT CHR$(4);"BLOAD NAME,A$4000"
30 GET A$
40 TEXT
50 END
```

## Power Sketch

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
#F 8 ONERR GOTO 900
F2 9 HGR : HGR2 : TEXT
BB 10 REM INITIALIZATION
BE 20 QW = 1:KB = - 16384:KF = - 16368:DA
    = 3:PG = 300:B1 = - 16287:B2 = - 1
    6286:X = 140:Y = 95:SC = 3
```

```

21 30 FOR T = 768 TO 792 STEP + 1
43 31 READ A: POKE T,A: NEXT T
89 40 POKE 230,32: POKE 232,0: POKE 233,3
: SCALE= 1: ROT= 0
83 60 GOTO 600
49 100 REM DRAW MODE
88 101 POKE - 16297,0: POKE - 16000 - PG,
0: POKE - 16302,0: POKE - 16304,0
8E 105 IF PDL (0) > 220 THEN X = X + QW
84 106 IF PDL (0) < 80 THEN X = X - QW
40 107 IF PDL (1) > 220 THEN Y = Y + QW
A2 108 IF PDL (1) < 80 THEN Y = Y - QW
FF 109 IF S = 3 THEN FOR I = 1 TO 50: NEX
T I
CD 110 IF PEEK (B1) > 127 THEN HCOLOR= DA
: DRAW M AT X,Y: GOTO 120
CE 111 IF PEEK (B2) > 127 THEN HCOLOR= 0:
DRAW M AT X,Y: GOTO 120
D0 112 IF PEEK (KB) = 195 THEN POKE KF,0:
GOSUB 150:DA = A: GOTO 100
94 113 IF PEEK (KB) = 155 THEN POKE KF,0:
GOTO 600
EF 115 IF PEEK (KB) = 211 AND S = 0 THEN
POKE KF,0:S = 3
F3 116 IF PEEK (KB) = 211 AND S = 3 THEN
POKE KF,0:S = 0
77 120 XDRAW M AT X,Y: XDRAW M AT X,Y
AC 125 GOTO 105
34 150 HOME : VTAB 16: HTAB 1: PRINT "0=BL
ACK ", "4=BLACK "
C4 151 VTAB 17: HTAB 1: PRINT "1=GREEN ",
"5=ORANGE"
92 152 VTAB 18: HTAB 1: PRINT "2=VIOLET",
"6=BLUE "
A1 153 VTAB 19: HTAB 1: PRINT "3=WHITE ",
"7=WHITE "
C0 154 IF FM = 1 THEN VTAB 20: HTAB 8: PR
INT "8=INVERSE"
47 155 TEXT
FA 160 VTAB 10: PRINT "WHICH COLOR:": GE
T A$
8D 161 A = VAL (A$)
31 165 RETURN
38 200 REM FILL MODE
8D 202 POKE - 16297,0: POKE - 16000 - PG,
0: POKE - 16302,0: POKE - 16304,0
DA 204 X = PDL (0):Y = PDL (1): IF Y > 18
8 THEN Y = 188
AA 205 XDRAW 1 AT X,Y: XDRAW 1 AT X,Y
41 206 IF PEEK (KB) = 155 THEN POKE KF,0:
BR = 0: GOTO 600
82 207 XDRAW 1 AT X,Y: XDRAW 1 AT X,Y
28 208 IF PEEK (B1) > 127 THEN FOR U = 1
TO 500: NEXT U: GOTO 210
38 209 GOTO 204
E2 210 PA = X:PB = Y
D0 211 X = PDL (0):Y = PDL (1): IF Y > 18
8 THEN Y = 188
84 212 GOSUB 213: GOTO 218
05 213 XDRAW 1 AT PA,PB
97 214 XDRAW 1 AT X,PB
ED 215 XDRAW 1 AT PA,Y
10 216 XDRAW 1 AT X,Y
30 217 RETURN
8A 218 IF PEEK ( - 16287) > 127 THEN 221
4F 219 IF PEEK (KB) = 155 THEN POKE KF,0:
BR = 0: GOTO 600
92 220 GOSUB 213: GOTO 211
3A 221 IF BR = 1 THEN 400
CF 223 FM = 1: GOSUB 150:FM = 0: POKE - 1
6297,0: POKE - 16000 - PG,0: POKE

```

```

- 16302,0: POKE - 16304,0
6C 224 IF A = 8 THEN 234
DB 225 HCOLOR= A
64 226 GOSUB 213
89 227 IF PB > Y THEN 231
E3 228 FOR T = PB TO Y STEP + 1
29 229 HPLLOT X,T TO PA,T
75 230 NEXT T: GOTO 206
79 231 FOR T = Y TO PB STEP + 1
0F 232 HPLLOT X,T TO PA,T
81 233 NEXT T: GOTO 206
38 234 IF PB > Y OR PA > X THEN 240
E1 235 FOR T = PB TO Y STEP + 3
93 236 FOR S = PA TO X STEP + 3
50 237 XDRAW 2 AT S,T
28 238 NEXT S: NEXT T
42 239 GOTO 206
60 240 IF PA > X THEN 250
83 241 FOR T = Y TO PB STEP + 3
85 242 FOR S = PA TO X STEP + 3
42 243 XDRAW 2 AT S,T
1A 244 NEXT S: NEXT T
34 245 GOTO 206
E3 250 IF PB > Y THEN 260
D5 251 FOR T = PB TO Y STEP + 3
38 252 FOR S = X TO PA STEP + 3
44 253 XDRAW 2 AT S,T
1C 254 NEXT S: NEXT T
36 255 GOTO 206
8F 260 REM
87 261 FOR T = Y TO PB STEP + 3
3A 262 FOR S = X TO PA STEP + 3
46 263 XDRAW 2 AT S,T
1E 264 NEXT S: NEXT T
38 265 GOTO 206
F6 300 REM SPRAY BRUSH
8A 301 POKE - 16297,0: POKE - 16000 - PG,
0: POKE - 16302,0: POKE - 16304,0
3F 305 HCOLOR= SC
D5 310 FOR Y = 1 TO 7 STEP + 1
89 311 FOR X = 1 TO 5 STEP + 1
9E 315 U = PDL (0) + 2:V = PDL (1) + 3: I
F V > 188 THEN V = 188
38 316 U = PDL (0) + 2:V = PDL (1) + 3
DF 317 IF PEEK ( - 16287) > 127 THEN HPLO
T PDL (0) + X, PDL (1) + Y
89 318 XDRAW 1 AT U,V: XDRAW 1 AT U,V
D8 320 IF PEEK (KB) = 195 THEN POKE (KF),
0: GOSUB 150:SC = A: GOTO 300
87 322 IF PEEK (KB) = 155 THEN POKE (KF),
0: GOTO 600
36 323 NEXT X: NEXT Y
A6 325 GOTO 310
8F 400 REM BRICK FILL
84 401 BR = 0
31 410 GOSUB 150: HOME : VTAB 10: INPUT "
BRICK WIDTH(1-20):":BW$
A9 412 VTAB 12: HTAB 1: INPUT "BRICK HEIG
HT(1-10):":BH$
E4 415 BW = VAL (BW$):BH = VAL (BH$)
0C 420 IF BW > 20 OR BW < 1 OR BH > 10 OR
BH < 1 THEN 410
91 425 IF PA > X THEN A1 = X:A2 = PA: GOT
O 428
6F 426 A1 = PA:A2 = X
AA 428 IF PB > Y THEN D1 = Y:D2 = PB: GOT
O 430
2A 429 D1 = PB:D2 = Y
CB 430 HCOLOR= A
83 440 HOME : VTAB 12: HTAB 10: PRINT "PL
EASE WAIT..."

```

```

3A 450 FOR T = D1 TO D2 STEP BH * 2
1C 452 H$ = A1, T TO A2, T
4E 454 FOR S = A1 TO A2 STEP BW
CE 456 H$ = S, T TO S, T + BH
2E 458 NEXT S: NEXT T
6C 460 FOR T = D1 + BH TO D2 STEP BH * 2
1E 462 H$ = A1, T TO A2, T
EF 464 FOR S = A1 + (BW / 2) TO A2 STEP B
W
D6 466 H$ = S, T TO S, T + BH
36 468 NEXT S: NEXT T
C5 470 POKE - 16297, 0: POKE - 16000 - PG,
0: POKE - 16302, 0: POKE - 16304, 0
11 471 FOR T = 1 TO 1000: NEXT T
26 480 GOTO 600
37 600 REM HELP SCREEN
CF 602 X = 140: Y = 95
C1 605 HOME : INVERSE : VTAB 3: HTAB 9: P
RINT "POWER SKETCH MENU": NORMAL
86 608 VTAB 1: HTAB 28: PRINT "HI-RES PAG
E: "; ( - PG + 301)
46 610 VTAB 6: HTAB 10: PRINT "<D> DRAW M
ODE"
D1 612 VTAB 8: HTAB 10: PRINT "<F> FILL M
ODE"
18 614 VTAB 10: HTAB 10: PRINT "<P> PAINT
MODE"
88 616 VTAB 12: HTAB 10: PRINT "<B> BRICK
LAYER"
1E 618 VTAB 14: HTAB 10: PRINT "<A> AIR B
RUSH"
92 620 VTAB 16: HTAB 10: PRINT "<E> PAGE
ERASE"
88 622 VTAB 18: HTAB 10: PRINT "<C> D.O.S
. COMMANDS"
1C 623 VTAB 20: HTAB 10: PRINT "<S> SWITC
H SCREENS"
46 625 TEXT
E4 630 VTAB 23: HTAB 5: PRINT "ENTER SELE
CTION: ";: GET A$
82 640 IF A$ = "D" THEN QW = 1: M = 1: GOT
O 100
A7 641 IF A$ = "F" THEN 200
22 642 IF A$ = "A" THEN 300
F2 643 IF A$ = "B" THEN BR = 1: GOTO 200
72 644 IF A$ = "P" THEN QW = 3: M = 2: GOT
O 100
34 645 IF A$ = "C" THEN 700
BC 646 IF A$ = "E" THEN 800
62 647 IF A$ = "S" THEN 950
E6 648 PRINT CHR$ (7);: GOTO 630
A9 700 REM DOS COMMANDS
97 705 HOME : VTAB 10: HTAB 5: PRINT "<A>
CATALOG"
83 710 VTAB 12: HTAB 5: PRINT "<B> LOAD S
CREEN"
9C 712 VTAB 14: HTAB 5: PRINT "<C> SAVE S
CREEN"
58 714 VTAB 16: HTAB 5: PRINT "<D> COPY S
CREEN"
58 716 VTAB 18: HTAB 5: PRINT "<E> EXIT"
C4 720 TEXT : VTAB 20: HTAB 1: PRINT "ENT
ER SELECTION";: GET A$: PRINT CHR$
(4)
26 721 IF A$ = "A" THEN 730
32 722 IF A$ = "C" THEN 735
35 723 IF A$ = "B" THEN 745
88 724 IF A$ = "E" THEN 600
39 725 IF A$ = "D" THEN 760
89 728 GOTO 720
E5 730 PRINT CHR$ (4): PRINT CHR$ (4); "CA
TALOGD1"

```

```

66 731 GET A$: GOTO 600
9C 735 HOME : VTAB 22: INPUT "SAVE PICTUR
E NAMED: "; A$
74 736 HOME : VTAB 22: PRINT "SAVE PAGE: "
;: GET B$
AE 737 IF B$ = "-" THEN 600
DD 738 IF B$ = "1" OR B$ = "2" THEN 740
CC 739 GOTO 736
87 740 IF B$ = "1" THEN B = 2000
11 741 IF B$ = "2" THEN B = 4000
CA 742 PRINT CHR$ (4): PRINT CHR$ (4); "BS
AVE "; A$; ", A$"; B; ", L$1FFF"
27 743 GOTO 600
CE 745 HOME : VTAB 22: INPUT "LOAD SCREEN
NAMED: "; A$
34 746 HOME : VTAB 22: PRINT "LOAD TO PAG
E: ";: GET B$
88 747 IF B$ = "-" THEN 600
E8 748 IF B$ = "1" OR B$ = "2" THEN 750
CF 749 GOTO 746
89 750 IF B$ = "1" THEN B = 2000
13 751 IF B$ = "2" THEN B = 4000
48 752 PRINT CHR$ (4): PRINT CHR$ (4); "BL
OAD "; A$; ", A$"; B
29 753 GOTO 600
78 760 HOME : VTAB 10: INPUT "NAME OF PIC
TURE TO COPY: "; F1$
8F 762 VTAB 12: HTAB 1: PRINT "INSERT DIS
K INTO DRIVE 1; <HIT A KEY>";: GET
IP$
94 765 PRINT CHR$ (4): PRINT CHR$ (4); "BL
OAD "; F1$; ", A$6000"
F7 768 VTAB 16: HTAB 1: PRINT "INSERT DES
TINATION DISK INTO DRIVE 1": VTAB
17: HTAB 1: PRINT "<HIT A KEY>";:
GET IP$
3E 770 PRINT CHR$ (4): PRINT CHR$ (4); "BS
AVE "; F1$; ", A$6000, L$1FFF"
23 780 GOTO 600
78 800 GOSUB 150: HCOLOR= A: H$ = 0, 0: C
ALL 62454: GOTO 600
3B 900 HOME : TEXT : VTAB 12: PRINT " ER
ROR!!!!!!": FOR T = 1 TO 1500: NEX
T T: GOTO 600
32 950 IF PG = 300 THEN PG = 299: GOTO 96
0
59 955 IF PG = 299 THEN PG = 300
C8 960 POKE - 16297, 0: POKE - 16000 - PG,
0: POKE - 16302, 0: POKE - 16304, 0
98 961 IF PG = 300 THEN POKE 230, 32
40 962 IF PG = 299 THEN POKE 230, 64
24 965 FOR T = 1 TO 1000: NEXT T
41 968 GOTO 600
D7 1000 DATA 3, 0, 8, 0, 13, 0, 22, 0, 139, 74, 150
, 9, 0, 139, 41, 245, 43, 245, 43, 181, 1, 0
, 0, 0, 255

```

aa



# Apple MLX

## Machine Language Entry Program

Tim Victor, Editorial Programmer

*"Apple MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs on the Apple computer. It runs on the II, II+, IIe, and IIfx, with either DOS 3.3 or ProDOS.*

A machine language program is usually listed as a long series of numbers. It's hard to keep your place and even harder to avoid making mistakes as you type in the listing, since an incorrect line looks almost the same as a correct one. To reduce the problems associated with typing in machine language programs, we've presented them as MLX listings which can be entered using the "Apple MLX" editor.

MLX checks your typing on a line-by-line basis. It won't let you enter inappropriate characters, and it won't let you continue if there's a mistake in a line or even if you're trying to enter a line or digit out of sequence. You don't have to know anything about machine language to use it. In other words, MLX makes machine language program entry almost foolproof.

### Using MLX

Type in and save MLX to disk (you'll want to use it to enter programs in this and future issues of *COMPUTE!'s Apple Applications Special*, as well as programs in *COMPUTE!* magazine and Apple-specific books from *COMPUTE!* Publications). It doesn't matter whether you type it in on a disk formatted for DOS 3.3 or ProDOS.

Programs entered with MLX, however, must be saved to a disk formatted with the same operating system as MLX itself.

If you have an Apple IIe or IIfx, make sure that the key marked Caps Lock is in the down position. Type RUN. You'll be asked for the starting and ending addresses of the machine language program. These values are given at the beginning of the machine language program listing and in the program's accompanying article. Find them and type them in.

The next thing you'll see is a menu asking you to select a function. The first is (E)nter Data. If you're just starting to type in a program, choose this function. Press the E key, and the program asks for the address where you want to begin entering data. Type the first number in the first line of the program listing if you're just starting, or the line number where you left off if you've already typed in part of a program. Hit the Return key and begin entering the data.

Once you're in enter mode, MLX will print the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight bytes and a checksum. When you enter a line and hit Return, MLX recalculates the checksum from the eight bytes and the address. If you enter more than or fewer than nine numbers, or if the checksum doesn't exactly match, MLX erases the line you just entered and prompts you again for the same line.

## Invalid Characters Banned

MLX is fairly flexible about how you type in the numbers. You can put extra spaces between numbers or leave the spaces out entirely, compressing a line into 18 keypresses. Be careful not to put a space between two digits in the middle of a number. MLX will read two single-digit numbers instead of one two-digit number (F 6 means F and 6, not F6).

You can't enter an inappropriate character with MLX. Only the numerals 0-9 and the letters A-F can be typed in. If you press any other key (with some exceptions noted below), nothing happens. This safeguards against entering extraneous characters. Even better, MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake.

MLX also checks to make sure you're typing in the right line. The address (the number to the left of the colon) is part of the checksum recalculation. If you accidentally skip a line and try to enter incorrect values, MLX won't let you continue. Just make sure you enter the correct starting address; if you don't, you won't be able to enter any of the following lines. MLX will stop you.

## Editing Features

MLX also includes some editing features. The left- and right-arrow keys allow you to back up and go forward on the line you're entering so that you can retype data. Pressing the Ctrl (*Control*) key and the D (*Delete*) key at the same time removes the character under the cursor, shortening the line by one character. Pressing the Ctrl key and the I (*Insert*) key simultaneously puts a space under the cursor and shifts the rest of the line to the right, making the line one character longer. If the cursor is at the right end of the line, neither Ctrl-D nor Ctrl-I has any effect.

When you've entered the entire listing (up to the ending address that you specified earlier), MLX automatically leaves Enter mode and redisplay the functions menu. If you want to leave Enter mode before then, press the Return key when MLX prompts you with the address of a new line.

## Display Data

The second menu choice, (D)isplay Data, examines memory and shows the contents in the same format as the program listing. You can use it to check your work or to see how far you've gotten. When you press the D key, MLX asks

you for a starting address. Type in the address of the first line that you want to see and hit Return. MLX displays program lines until you press any key or until it reaches the end of the program.

## Save and Load

Other menu selections are provided to let you save programs to disk and load them back into the computer. These are (S)ave File and (L)oad File. MLX asks you for the name of the file which contains the program. The first time you save a machine language program, there won't be a file on the disk containing the program. Whatever name you type in will be the name of a new file that's created.

The message DISK ERROR appears during a SAVE or LOAD if a problem is detected. If you're not sure why a disk error has occurred, check the disk drive. Make sure there's a formatted disk in the drive and that it was formatted by the same operating system that you're using for MLX (ProDOS or DOS 3.3). If you're trying to save a file and see an error message, the disk might be full. Either save the file on another disk or quit MLX (by pressing Q), delete an old file or two, and then run MLX again. Your typing should still be safe in memory. If the error message appears during a load, you may have specified a filename that doesn't exist on the disk.

## Quit

The (Q)uit menu option has the obvious effect—it stops MLX and enters BASIC. (Of course, you can also press Ctrl-Reset to get out of MLX.)

## The Finished Product

When you've finished typing all the data for a machine language program and have saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. You'll almost always load and run an MLX-generated program by typing BRUN *filename* (or sometimes just BLOAD).

## An Ounce Of Prevention

By the time you finish typing in the data for a long program, you may have several hours invested in the project. Don't take chances—use the "Apple Automatic Proofreader" to enter MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of

data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses; then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to insure that you can recall your work from disk. Don't let a simple typing error in MLX cost you several nights of hard work.

Line 100 of MLX traps all errors to line 610. If MLX is typed in correctly, only disk errors should be encountered. A disk-error message when you're not trying to access the drive—for example, when you first start entering data—indicates a typing error in the MLX program itself. If this occurs, hit Ctrl-Reset to break out of MLX and carefully compare your entry against the printed listing.

### Apple MLX: Machine Language Entry Program

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```

88 100 N = 9: HOME : NORMAL : PRINT "APPL
    E MLX": POKE 34,2: ONERR GOTO 610
CC 110 VTAB 1: HTAB 20: PRINT "START ADDR
    ESS";: GOSUB 530: IF A = 0 THEN PR
    INT CHR$ (7): GOTO 110
8C 120 S = A
E3 130 VTAB 2: HTAB 20: PRINT "END ADDRES
    S ";: GOSUB 530: IF S >= A OR A
    = 0 THEN PRINT CHR$ (7): GOTO 130
28 140 E = A
85 150 PRINT : PRINT "CHOOSE:(E)NTER DATA
    ";: HTAB 22: PRINT "(D)ISPLAY DATA
    ";: HTAB 8: PRINT "(L)OAD FILE (S)
    AVE FILE (Q)UIT": PRINT
AE 160 GET A$: FOR I = 1 TO 5: IF A$ < >
    MID$ ("EDLSQ",I,1) THEN NEXT : GOT
    O 160
93 170 ON I GOTO 270,220,180,200: POKE 34
    ,0: END
AF 180 INPUT "FILENAME: ";A$: IF A$ < > "
    " THEN PRINT CHR$ (4);"BLOAD";A$;"
    ,A";S
A1 190 GOTO 150
6D 200 INPUT "FILENAME: ";A$: IF A$ < > "
    " THEN PRINT CHR$ (4);"BSAVE";A$;"
    ,A";S;"L";E - S
92 210 GOTO 150
C2 220 GOSUB 590: IF B = 0 THEN 150
9E 230 FOR B = B TO E STEP 8:L = 4:A = B:
    GOSUB 580: PRINT A$;" ";:L = 2
85 240 FOR F = 0 TO 7:V(F + 1) = PEEK (B
    + F): NEXT : GOSUB 560:V(9) = C
F2 250 FOR F = 1 TO N:A = V(F): GOSUB 580
    : PRINT A$" ";: NEXT : PRINT : IF
    PEEK (49152) < 128 THEN NEXT
94 260 POKE 49168,0: GOTO 150
CC 270 GOSUB 590: IF B = 0 THEN 150
48 280 FOR B = B TO E STEP 8
A6 290 HTAB 1:A = B:L = 4: GOSUB 580: PRI
    NT A$;" ";: CALL 64668:A$ = "":P
    = 0: GOSUB 330: IF L = 0 THEN 150

```

```

F9 300 GOSUB 470: IF F < > N THEN PRINT C
    HR$ (7);: GOTO 290
27 310 IF N = 9 THEN GOSUB 560: IF C < >
    V(9) THEN PRINT CHR$ (7);: GOTO 29
    0
72 320 FOR F = 1 TO 8: POKE B + F - 1,V(F
    ): NEXT : PRINT : NEXT : GOTO 150
8E 330 IF LEN (A$) = 33 THEN A$ = 0:P =
    0: PRINT CHR$ (7);
22 340 L = LEN (A$):O$ = A$:O = P:L$ = ""
    : IF P > 0 THEN L$ = LEFT$ (A$,P)
E8 350 R$ = "": IF P < L - 1 THEN R$ = RI
    GHT$ (A$,L - P - 1)
55 360 HTAB 7: PRINT L$;: FLASH : IF P <
    L THEN PRINT MID$ (A$,P + 1,1);: N
    ORMAL : PRINT R$;
78 370 PRINT " ";: NORMAL
E6 380 K = PEEK (49152): IF K < 128 THEN
    380
C1 390 POKE 49168,0:K = K - 128
58 400 IF K = 13 THEN HTAB 7: PRINT A$;"
    ";: RETURN
8A 410 IF K = 32 OR K > 47 AND K < 58 OR
    K > 64 AND K < 71 THEN A$ = L$ + C
    HR$ (K) + R$:P = P + 1
C1 420 IF K = 4 THEN A$ = L$ + R$
5F 430 IF K = 9 THEN A$ = L$ + " " + MID$
    (A$,P + 1,1) + R$
8A 440 IF K = 8 THEN P = P - (P > 0)
93 450 IF K = 21 THEN P = P + (P < L)
9D 460 GOTO 330
37 470 F = 1:D = 0: FOR P = 1 TO LEN (A$)
    :C$ = MID$ (A$,P,1): IF F > N AND
    C$ < > " " THEN RETURN
88 480 IF C$ < > " " THEN GOSUB 520:V(F)
    = J + 16 * (D = 1) * V(F):D = D +
    1
5F 490 IF D > 0 AND C$ = " " OR D = 2 THE
    N D = 0:F = F + 1
88 500 NEXT : IF D = 0 THEN F = F - 1
17 510 RETURN
85 520 J = ASC (C$):J = J - 48 - 7 * (J >
    64): RETURN
AB 530 A = 0: INPUT A$:A$ = LEFT$ (A$,4):
    IF LEN (A$) = 0 THEN RETURN
6F 540 FOR P = 1 TO LEN (A$):C$ = MID$ (A
    $,P,1): IF C$ < "0" OR C$ > "9" AN
    D C$ < "A" OR C$ > "Z" THEN A = 0:
    RETURN
2D 550 GOSUB 520:A = A * 16 + J: NEXT : R
    ETURN
28 560 C = INT (B / 256):C = B - 254 * C
    - 255 * (C > 127):C = C - 255 * (C
    > 255)
28 570 FOR F = 1 TO 8:C = C * 2 - 255 * (
    C > 127) + V(F):C = C - 255 * (C >
    255): NEXT : RETURN
DA 580 I = FRE (0):A$ = "": FOR I = 1 TO
    L:T = INT (A / 16):A$ = MID$ ("012
    3456789ABCDEF",A - 16 * T + 1,1) +
    A$:A = T: NEXT : RETURN
IF 590 PRINT "FROM ADDRESS ";: GOSUB 530:
    IF S > A OR E < A OR A = 0 THEN B
    = 0: RETURN
8D 600 B = S + 8 * INT ((A - S) / 8): RET
    URN
86 610 PRINT "DISK ERROR": GOTO 150

```

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# Apple Automatic Proofreader

Tim Victor, Editorial Programmer

*It's easier than ever to enjoy programs for Apple II-series computers. "Apple Automatic Proofreader," an error-checking program for the Apple II, II+, IIe, and IIC, with either DOS 3.3 or ProDOS, alerts you to almost every typing mistake you might make.*

"Apple Automatic Proofreader" will help you type in program listings without typing mistakes. It's a short error-checking program that hides itself in memory and attaches to your Apple's operating system. Each time you press Return to enter a program line, this routine displays a two-digit checksum at the top of your screen. If you've typed the line correctly, the checksum on your screen matches the one in the printed listing—it's that simple. You don't have to use the Proofreader to enter listings, but doing so greatly reduces your chance of making a typo.

## Getting Started

First, type in the Apple Automatic Proofreader program following this article. The Proofreader can't check itself before it's done, so you'll have to be extra careful to avoid mistakes.

The Proofreader checks which operating system you're running before it hooks up the checksum routine, so you can type it in with either DOS 3.3 or ProDOS. If you want to use the Proofreader with both operating systems, you won't have to retype it. All you need is a utility to copy a file between disks with different formats, such as the one provided on the ProDOS *User's* or *System Utilities* disk.

As soon as you finish typing the Proofreader, save at least two copies. This is very important, because the Proofreader erases the

BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Now, type RUN and hit Return. The Proofreader clears the screen, loads the machine language routine, displays the message PROOF-READER ACTIVATED, erases the BASIC portion of itself, and ends. If you type LIST and press Return, you'll see that no BASIC program is in memory. The computer is ready for you to type in a new BASIC program.

## Entering Programs

Once the Proofreader is activated, you can begin typing in a BASIC program as usual. Every time you finish typing a line and press Return, the Proofreader displays a two-digit checksum number in the upper-left corner of the screen. Compare this checksum with the two-digit checksum printed next to the corresponding line in the program listing. If the numbers match, you can be pretty certain the line was typed correctly. Otherwise, check for your mistake and type the line again.

A common mistake when entering BASIC programs on the Apple occurs when you accidentally press a key while holding down the Control key. This adds an invisible control character to the line you are typing. If you don't find it before you run the program, this stray character may cause a SYNTAX ERROR or other mysterious behavior. Fortunately, the Proofreader detects the presence of these invisible control characters and displays a checksum that doesn't match the one in the listing. So it's always a good idea to retype a line if the checksums don't match, even though you might not see any difference in the lines themselves.



The Proofreader ignores space characters, so you can omit spaces between keywords and still see a matching checksum. Spaces are important only between the quotation marks of PRINT statements or string assignments. The only mistake the Proofreader won't catch is if you accidentally type too many spaces or leave some out. For this reason, be extra careful when you're entering text within quotes.

Before running another BASIC program, it's a good idea to turn off the Proofreader by holding down the Control key while pressing the Reset button. The machine language part of the Proofreader is kept in memory starting at address 768 (\$300 hexadecimal). This location is out of BASIC's way, but a lot of other programs use this same place for their machine language subroutines. Disable the Proofreader to avoid conflicts.

## How It Works

When the Applesoft BASIC interpreter needs to get a line of input from the keyboard, it calls a machine language routine in the Apple's read-only memory (ROM) called GETLN. GETLN, in turn, calls the operating system to get a single keypress, which it stores in an input buffer. If the Return key was pressed, GETLN ends, leaving one new line for the BASIC interpreter in the input buffer. Otherwise, it repeats the process, asking for another keypress.

The operating system normally gets individual keystrokes from a ROM routine called KEYIN, but the Proofreader changes this. When the Proofreader is installed, the operating system calls the checksum routine instead, and the checksum routine asks KEYIN for a character. If any key other than Return was pressed, the checksum routine just passes it on to the operating system, which gives it to GETLN. But if Return *was* pressed, the checksum routine examines the contents of GETLN's input buffer, which now contains an entire line of input, to calculate the checksum that it displays at the top of the screen.

A common typing mistake is transposition—typing two successive characters in the wrong order, like *PIRNT* instead of *PRINT*. A checksum program that merely adds the codes of the characters in a line can detect only the presence or absence of a character, not transposition errors. Because the Apple Proofreader uses a sophisticated formula to compute checksums, it alerts you to transposed keystrokes.

The Apple Automatic Proofreader detects almost every possible typing mistake, including

transpositions, missing or extra characters, accidental control characters, and incorrect line numbers. Typing *COMPUTE!'s Apple Applications Special* programs into your Apple computer has never been easier.

## Apple Automatic Proofreader

```

10 C = 0: FOR I = 768 TO 768 + 68: READ A: C = C + A: POKE I, A: NEXT I
20 IF C < > 7258 THEN PRINT "ERROR IN PROOFREADER DATA STATEMENTS": END
30 IF PEEK (190 * 256) < > 76 THEN POKE 56, 0: POKE 57, 3: CALL 1002: GOTO 50
40 PRINT CHR$ (4); "IN#A$300"
50 POKE 34, 0: HOME : POKE 34, 1: VTAB 2 : PRINT "PROOFREADER INSTALLED"
60 NEW
100 DATA 216, 32, 27, 253, 201, 141
110 DATA 208, 60, 138, 72, 169, 0
120 DATA 72, 189, 255, 1, 201, 160
130 DATA 240, 8, 104, 10, 125, 255
140 DATA 1, 105, 0, 72, 202, 208
150 DATA 238, 104, 170, 41, 15, 9
160 DATA 48, 201, 58, 144, 2, 233
170 DATA 57, 141, 1, 4, 138, 74
180 DATA 74, 74, 74, 41, 15, 9
190 DATA 48, 201, 58, 144, 2, 233
200 DATA 57, 141, 0, 4, 104, 170
210 DATA 169, 141, 96

```

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## Apple Disk

All Apple II programs in this issue are available on the companion *Apple Applications Disk*. Formatted for both DOS 3.3 and ProDOS, the *Disk* costs \$12.95, plus \$2.00 shipping and handling, and can be purchased only through **COMPUTE!** Publications. See page 33 for details.

# Reviews

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## Acta

Sharon Zardetto Aker

An electronic outliner can be used to organize anything from a simple report to the great American novel. *Acta*, an outliner for the Macintosh, is an extremely useful tool, made more so by the fact that it's a desk accessory—it's always there when you need it.

In an outliner, you type a list of items (*Acta* calls them "topics") and beneath each item enter subordinate items. A subtopic can have subtopics of its own, and so on, down as many levels as you need. The two-fold advantage of an outliner over a word processor is the ease with which you can rearrange things and the way you can "collapse" subtopics out of sight so that you can view only the major topics.

### Working With Topics

Entering topics is simple. A gray frame with a blinking cursor indicates the current topic. All you have to do is type. *Acta* uses a matriarchical hierarchy: a subordinate topic is a *daughter*, topics on the same level are *sisters*, a topic that has subtopics is the *mother*, and a topic that's not indented as far as the one immediately above is an *aunt*.

To type a new topic, you can press Enter and get a new frame on the same level as the one you just finished. Command-S (for sister) does the same thing. If you want the new topic to be subordinate to the current one, Command-D creates the daughter.

Command-A creates an aunt, a new topic that's one level to the left. These command sequences are simple to remember—not only do the letters stand for the type of topic you want, but A, S, and D can also stand for *above*, *same*, and *down*, which describe the relative

level of the new topic. As if that weren't enough, these three keys are grouped on the keyboard, and their positions there are analogous to the positions of the topics they create.

You can change the level of a topic by menu command, by keyboard command, or with the mouse. From the keyboard, Command-R and Command-L shift the current topic right and left. While this is logical, it's a little awkward in practice, since the R key is typed with the left hand and the L key with the right hand. A Tab and Shift-Tab option for moving topics right and left would be more convenient.

You can always drag a topic with the mouse, moving it to a different level at its current spot or changing its position in the outline entirely. When you move a topic, the whole family of subtopics moves with it.

### Collapsing And Expanding

The single most important option that makes an outliner an outliner and not just a word processor is its ability to collapse and expand the families of topics that you create. You can collapse any group of subtopics under its heading or collapse all the families in the outline so that you can scroll through only the major topics.

A family of subtopics can be collapsed or expanded at any time by menu selection, by keyboard command, or just by double-clicking on the topic's leader character. The leader characters—solid or hollow triangles—make it easy to keep track of which topics have hidden subtopics. Solo topics are preceded by the solid triangle, while any topic with subtopics is labeled with a hollow triangle.

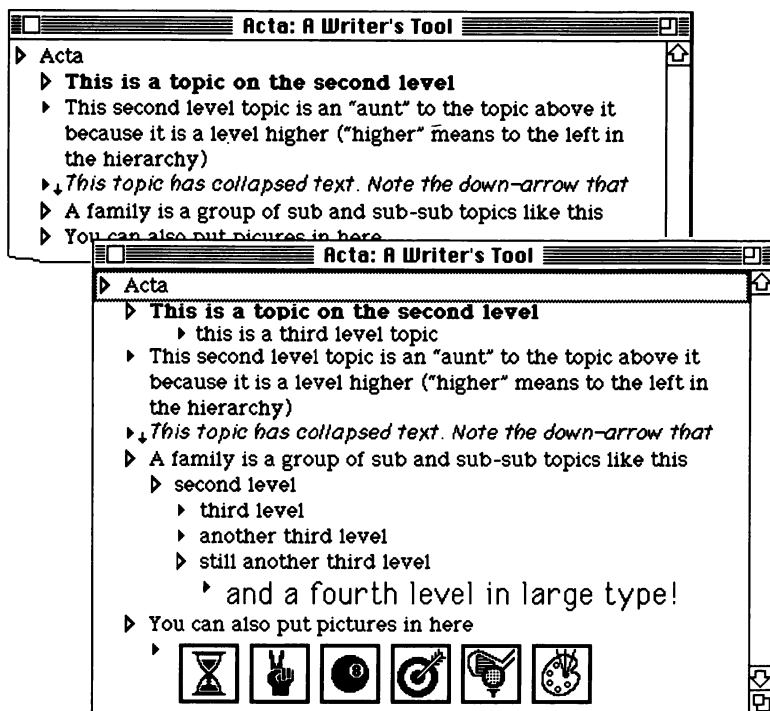
*Acta* doesn't limit you to brief topic statements or descriptions. You can type as much as you

want on any topic level and the text wraps around to fit within the window. You can even begin a new paragraph in a topic frame just by pressing Return. Because paragraphs of text make it hard to see the overall structure of an outline, *Acta* lets you collapse a wordy topic so that only its first line shows. A click of the mouse button while you're holding the Option key collapses the text, and another Option-click opens it up again. A small downward-pointing arrow next to the triangle leader character indicates that there's hidden text in the topic.

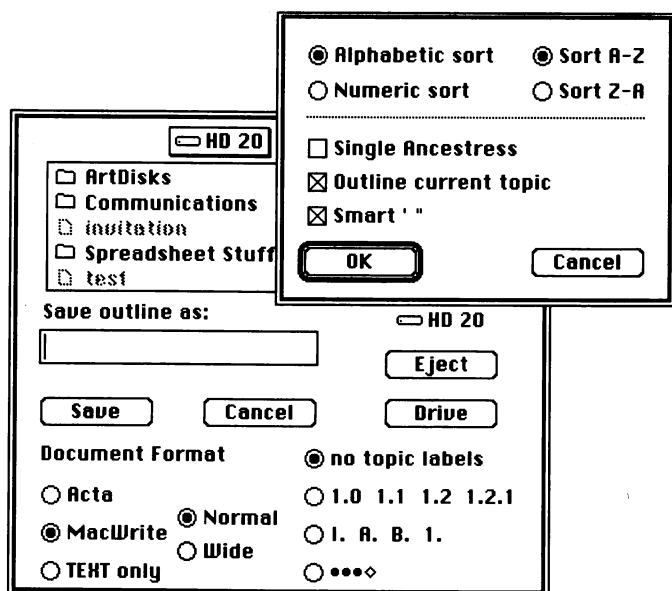
The leading triangles also let you work with entire topics and families instead of with just the text of a topic. Normal Macintosh editing features work within a topic frame: double-clicking selects a word; dragging highlights text. A Cut or Copy command applies to the selected text in the current topic. If, however, you select the topic's triangle by clicking on it, you can manipulate the whole topic. Dragging, for instance, moves it around in the outline, and Cut or Copy affects the entire topic. When a topic is selected, its triangle is highlighted, and all operations affect the whole family of subtopics beneath it.

### Saving *Acta* Outlines

In addition to pasting an outline or part of an outline directly into your word processor, you can save the *Acta* outline under any of a number of formats. A *MacWrite* save lets you open the outline directly into *MacWrite*. You can also open from *Microsoft Word*, which will make the necessary formatting changes for you. A Text save creates a text file of your outline so that you can use it in any application that lets you access text files. Then, of course, there's the *Acta* format which allows you



The top view shows the *Acta* outline collapsed so that only the main topics show, while the bottom view is fully expanded. The leader character for each topic indicates whether or not there are any subtopics beneath and whether the topic has collapsed text.



*Acta* offers plenty of options, both within the program and for Save formats.

to access the outline again from *Acta*. When you save an *Acta* outline in *MacWrite* or Text format, you have the further option of defining the leader characters that will be included in the document. The topics can be numbered (1.1, 1.2, 1.3); they can have alphanumeric labels (roman numerals, followed by uppercase letters, followed by numbers); they can be preceded by bullets; or, you can dispense with the leader characters entirely.

### Extras

With only these features, *Acta* would be a versatile, useful tool. However, it goes beyond these basics:

- You can control the font, size, and style of type in any topic or any family of topics. The most recent version of *Acta* lets you scroll through the list of fonts in your System so that you can select any one you want.
- You can paste graphics into a topic frame instead of typing text.
- You can sort topics alphabetically or numerically, backward or forward.
- A Find option searches through the outline for any text you want.
- You can specify "smart quotes" so that the quotation marks saved in a text or *MacWrite* file will be curved characters instead of the standard straight lines.
- You can set the default font that *Acta* uses.
- You can turn on the Single Ancestress option, which keeps the first topic on a level by itself, serving as a title for the outline.
- There's a Runner utility which lets you run *Acta* as a stand-alone application if you have a 128K Mac.
- A recent update includes a default file option that will automatically

# Reviews

open a specific *Acta* file when *Acta* is selected from the Apple menu.

## Room For Improvement

*Acta*'s great, but it's not perfect. Most notably absent is a print command. In the current version, you have to put a file in another application before you can print it.

A less obvious drawback is the lack of two-way communication between *Acta* and the application you're running. Although you can paste copied text into *Acta*, it all goes into one topic frame since Return is used to start a new paragraph, not a new topic. If this were corrected, you could use *Acta* to sort items you've listed in your word processor or to rearrange text that was in another document. These are minor criticisms, however. *Acta* is one of the most useful desk accessories ever designed for the Macintosh, and future updates will undoubtedly address these points and include even more in the way of "extras."

*Acta*  
Macintosh 128K, 512K,  
512K Enhanced, Plus  
Symmetry Software  
761 East University Dr.  
Mesa, AZ 85203  
\$59.95

## WordPerfect

Bob Guerra

Picture the ideal word processor.

It would be powerful, yet easy to use. It would come with a clearly written, well-organized user's manual featuring a hands-on tutorial. It would let you create, edit, format, and print all types of documents with ease.

The ideal word processor would also put text on the screen and make it look like the printed page instead of like some complex

chemical formula. By keeping enigmatic formatting commands out of sight, it would allow you to focus all your attention on your writing. Finally, the ideal word processor would be free of copy-protection to let hard-disk users easily incorporate the program's files into their system.

With the release of *WordPerfect* (Version 1.1), WordPerfect Corporation has come close to this ideal word processor. The latest version of *WordPerfect* for the Apple IIe, IIc, and their compatibles is a multifeatured word processing system that lets you efficiently prepare every imaginable type of document, from term papers complete with footnotes to lengthy business reports.

## Get Going

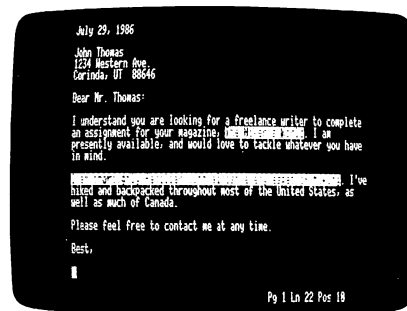
*WordPerfect* comes on three double-sided, unprotected disks. These include the program/utilities disk, a work/learn disk containing files used with the program's tutorial, and a 50,000-word dictionary disk with additional utilities on the flip-side.

WordPerfect Corporation promises to replace any defective *WordPerfect* disks within 90 days of purchase as long as you properly register by returning the enclosed warranty card within the first 10 days. Sending in the card also places you on a list to receive customer service and update notices.

Also included are an extensive user's manual contained in a small three-ring binder, a self-sticking keyboard template that fits in place above the number keys, and a quick-reference card listing well over 100 editing and cursor-control commands. (This list of commands may also be displayed on the screen at any time by pressing the open- or solid-Apple key and the question

mark.)

To help you get started using the system, the 11-lesson tutorial takes you from the basics of cursor control and simple text entry to some of the program's more advanced features such as the use of footnotes, search and replace, and the merging of files to quickly create personalized letters and memos. The 140-page tutorial also includes lessons on the use of macros (files in which you can store text and commands that will be used repeatedly), file management, and all types of page formatting. The tutorial even has its



When you start *WordPerfect*, the screen is completely blank except for the single status line at the bottom. Entering, editing, and formatting text is comfortably easy. Note the highlighted sections of text—they indicate boldface or underlined material. The error in the first sentence of the second paragraph can be changed simply by cursoring up and inserting another letter.

own index so you can tell at a glance which lesson(s) cover specific topics.

When you begin using *WordPerfect*, the first thing you'll notice is that the screen is totally blank with the exception of a short line of text in the lower right corner. This displays the current page, line number, and column where the cursor is located. When you reach the end of a line of text



you're typing, any word that's too large to fit on the current line is either "wrapped" to the next line or, if hyphenation prompting is turned on, the program may stop, beep, and give you the opportunity to hyphenate the word. You may either enter text in the default insert mode or switch to the typeover mode, which lets you replace characters, but leaves hidden formatting codes unchanged. As you type, all text above the cursor position is automatically formatted according to the line length you specify. Although portions of the text may occasionally appear unformatted as you're editing, a rewrite command allows you to reformat the screen output to more closely resemble the finished product.

Centered text appears centered onscreen, for example. Flush right—as well as indented—text looks much the same onscreen as it does when printed. Both bold and underlined portions of text are highlighted in reverse lettering. If you forget whether a particular section of highlighted text was set as bold or underlined, you can simply move the cursor through the text and a *B* or *U* appears in the bottom left of the screen. Unfortunately, neither justified nor proportional text appears as such onscreen.

Although the *WordPerfect* screen is usually free from all embedded formatting commands, they can be seen at any time by entering the Codes command. This lets you view, delete, and modify the codes which control such parameters as margins, spacing, alignment, tabs, headers, footers, and printer controls. Special cursor controls let you quickly locate the beginning and end of your document's codes, and specific codes may even be searched for as in normal text.

*WordPerfect's* numerous cursor-control commands let you zip around your document with amazing speed. Not only can you instantly move to the beginning or end of your text; you can move to the beginning or end of the current line, move up or down an entire screen or page, move one word at a time in either direction, or go directly to any specified character, number, or page. In addition, the Esc key can be used in conjunction with the cursor keys to move a preset number of characters, lines, or pages.

Characters and words are easily deleted; you can also delete to the end of the current line or page with just a couple of keystrokes. Larger areas of text may be defined using the block command, and then deleted, copied, moved to another section of the document, saved for later use, printed, or appended directly into another file. Once defined, an entire block can also be converted to upper- or lowercase, boldface, or underlined text.

### **Put Together, Then Print**

Not only does *WordPerfect* let you move around your documents quickly and make major changes with ease; it also helps you create professional-looking letters, papers, and manuscripts with its special formatting features. For instance, words which you'd like to see remain together on one line can be separated by something called *hard spaces*. Similarly, words which may have to be hyphenated when the final version is ready for printing can be separated with *soft hyphens*. If editing changes subsequently eliminate the need for hyphenation, the soft hyphen automatically disappears and the word pulls together again.

Another way that *WordPerfect* improves the appearance of your

documents is by helping you to avoid *widows* and *orphans*, those single first or last lines of a page that have been separated from the rest of the paragraph they belong to. Entire paragraphs may even be protected from page breaks by placing a Conditional End Of Page command before the paragraph. If the paragraph won't fit entirely on one page when printed, it will be moved in one piece to the next page.

Once your document has been edited and formatted to your satisfaction, you can print it using any of three printer/printer card combinations that you have previously selected and saved as special macro files. These files automatically set up *WordPerfect* to work with your printer(s) each time you boot the system. *WordPerfect* can be configured to work with a wide variety of popular printers and can be set for hand-fed, sheet-fed, or continuous-form paper. In addition, up to eight fonts may be selected for each printer and changed at will by inserting printer control commands into your document.

The size of the files you can create using *WordPerfect* depends on your hardware. On a single formatted disk you can save a 60-page document. If you have a RAMWORKS memory board or similar RAM drive, you'll be able to edit and store close to 1 million characters. Hard-disk users can create files of up to 16 million characters.

When you save a text file, it's automatically stamped with the date—providing you used the set date feature while working on the document. If your Apple is equipped with a clock card, the date is set for you. The documents you save may also be locked to prevent them from being altered inadvertently. Once a file has

# Reviews

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been locked, it can't be deleted, renamed, or saved with the same filename until you decide to unlock it.

By now you've probably realized that *WordPerfect* has so many features that, unless you make your living as a technical writer, you may be hard-pressed to find ways to exploit all of the system's capabilities. Even so, if you take your writing seriously and need a word processor that can handle any kind of writing you throw at it, *WordPerfect* is a logical choice. It has almost all the features found on professional systems costing hundreds of dollars more, and is much easier to learn than most.

*WordPerfect 1.1*  
*Apple IIe or IIc with 128K, 80-column monitor, one disk drive (two recommended)*  
*WordPerfect Corporation*  
*288 West Center Street*  
*Orem, UT 84057*  
*\$179.00*

## Touch Window

James V. Trunzo

Personal Touch Corporation's Touch Window is actually several products at once. It's a touch screen that removes the need for keyboard skills; a graphics tablet that lets you draw, trace, and paint on your computer screen; and an interactive book pad that's both educational and enjoyable. That's what the advertisements for Touch Window say. The question is whether or not the claims are true.

The answer is both yes and no.

### Impressive Work

Technologically, the Touch Window is an impressive piece of work. Lightweight and easily installed, it attaches to any 9- to 15-

inch monitor screen with Velcro pads, and connects with your computer through the 16-pin game port.

The Touch Window screen shows excellent sensitivity and immediate response to the touch. The electronic sensing hardware averages the area of contact and reports only the coordinates at the center of this area. The company's claim that this feature allows the drawing of very fine lines proved true. It also allows for a margin of error in placing the finger or stylus, an important factor when small children are using the Touch Window. In addition, the Touch Window may be used on a desk top or in your lap, depending on the application. In fact, depending on the application and the age of the user, it's often the best way to use the device.

When you buy a Touch Window, you don't just buy equipment. You get an array of software programs with it as well. Included are disks containing a simplified word processor, a good graphics program, a very basic expense account manager, several games (including checkers, which really highlights the potential of the Touch Window), and an interactive book that contains a variety of activities ranging from educational to entertainment.

### Computer Equality

The Touch Screen has several very important uses. For example, my six-year-old found the Touch Window to be her answer to computer equality. With hands too small to comfortably use a joystick and with just recently refined knowledge of the alphabet (thus limiting her use of the keyboard), the Touch Window gave her a natural way to communicate with the computer. She pointed and touched.

For young children, the Touch Window is a real benefit. The interactive booklet included with the package contained several programs that a youngster can use with ease—the Touch Window doesn't force them to use refined motor skills.

That same trait of the Touch Window also makes it a tool which lets some physically and/or mentally handicapped individuals use a computer. Someone with cerebral palsy, for example, would find the Touch Window technology much easier to use than a keyboard or a joystick with buttons. The Touch Window's sensitivity, paradoxically, supports both highly refined drawing and general area pointing. The stylus could even be held in one's mouth and used effectively, in the event that the user's hands were not functional.

Finally, the Touch Window has credibility when thought of in terms of first-time computer users, regardless of age. Many of the programs included eliminate the need to memorize keyboard combinations and make liberal use of icons to save and print material. Uninitiated computer users will find the Touch Window an un-intimidating way of getting to know their machine and familiarizing themselves with the computer's capabilities.

### Appropriate Uses

There's only one real problem with the product, but it's nothing to overlook. At this point, the more sophisticated the need, the less appropriate the Touch Window seems to be. This has nothing to do with the performance of the Touch Window itself. It just comes down to the fact that many regular computer users are familiar and comfortable with the keyboard. If you're a speed typist, in

## Touch Window-Compatible Apple II Software

According to Personal Touch Corporation, the following programs are Touch Window compatible. This list was accurate as of August, 1986.

Title	Publisher
<b>Education</b>	
<i>First Categories</i>	Laureate Learning Systems
<i>First Verbs</i>	Laureate Learning Systems
<i>First Words II</i>	Laureate Learning Systems
<i>Following Directions</i>	Laureate Learning Systems
<i>Learning Left and Right</i>	Laureate Learning Systems
<i>Micro-LADS</i>	Laureate Learning Systems
<i>Bank Street Storybook</i>	Mindscape
<i>The Newsroom</i>	Springboard Software
<i>The Factory</i>	Sunburst Communications
<i>Muppetville</i>	Sunburst Communications
<i>The Muppet Word Book</i>	Sunburst Communications
<i>Odd One Out</i>	Sunburst Communications
<i>The Right Turn</i>	Sunburst Communications
<i>Touch 'N' Write</i>	Sunburst Communications
<b>Family Enrichment</b>	
<i>Design Your Own Home</i>	Avant-Garde
<i>Interactive Book I*</i>	Personal Touch
<i>Master Touch I*</i>	Personal Touch
<b>Games</b>	
<i>Sargon III</i>	Hayden Software/Spinnaker
<i>Bishop's Square*</i>	Personal Touch
<i>Touch Checkers*</i>	Personal Touch
<b>Graphics</b>	
<i>Blazing Paddles</i>	Baudville
<i>Beagle Graphics</i>	Beagle Brothers
<i>Dazzle Draw</i>	Brøderbund Software
<i>Fantavision</i>	Brøderbund Software
<i>Print Shop</i>	Brøderbund Software
<i>Coloring Series I, Geometric Designs</i>	Koala Technologies
<i>Graphics Exhibitor</i>	Koala Technologies
<i>Color Me</i>	Mindscape
<i>Complete Graphics System</i>	Penguin Software
<i>Graphics Magician</i>	Penguin Software
<i>Magic Paintbrush</i>	Penguin Software
<i>TouchGraphics I*</i>	Personal Touch
<b>Spreadsheet</b>	
<i>Expense Account Manager*</i>	Personal Touch
<b>Utilities</b>	
<i>Programmer's Tool Kit</i>	Koala Technologies
<i>Touch Window Tool Kit</i>	Personal Touch
<b>Word Processing</b>	
<i>TouchWriter*</i>	Personal Touch

\* These programs are included on the Master Touch I disk, which is included with the Touch Window package.

many cases it would prove slower to have to remove your hands from the keyboard, touch the screen (usually several times in a sequence), and then reorient your hands on the keyboard. With the increasing use of keyboard macros that reduce the keystrokes necessary for certain operations, this drawback may prove even more significant.

Additionally, once the novelty of using the Touch Window wore off, my precocious nine-year old daughter and I found little to choose from in the way of convenience and speed when comparing the touch screen to a joystick, and it was probably less functional than a mouse.

If it sounds like I'm panning the Touch Window, I'm not. The key to Touch Window appears to be not *if* it can be used, but *how* it can be best used. For example, while it's hard for me to visualize a relational database being used with Touch Window, if the product is geared toward specific needs, I believe it will be an excellent addition to computer technology. Software support is coming (see adjacent list of software), and this may well determine the success of Touch Window.

Overall, the Touch Window does what it claims to do. It's a sensitive, responsive tool and certainly deserves your consideration. Try it. It might well be the answer for you.

Touch Window  
Apple II, II+, IIe, or IIc computer, with  
a minimum of 64K RAM, disk drive, and  
color or monochrome display. An extra  
adapter cable is required for the Apple  
II and II+ computers (available from  
the manufacturer and dealers).  
Personal Touch Corporation  
4320 Stevens Creek Blvd.  
San Jose, CA 95129  
\$199.95

# Reviews

## Paradise Mac-20 Hard Disk Drive

Gregg Keizer, Editor

Once you've used one, if only for a few days, you're hooked. There's no going back, at least not without a lot of kicking and screaming. We're talking about *hard disks* here, mass-storage devices that offer as much room as 25–50 microfloppies.

Also until recently, hard disks for the Macintosh came in three flavors—internal (the Hyper-Drive), external connected to a serial port (the printer port, usually), and external connected to the disk drive port (Apple's Hard Disk 20). But now, because of the Macintosh Plus and its Small Computer Systems Interface (SCSI) port, the choices are more varied. Since the SCSI port lets you connect up to seven peripherals and, even more importantly, since it allows *fast* data transfers, internal and external SCSI-compatible drives are appearing. You can even find third-party manufacturers who add an SCSI port to your 512K Macintosh so you can use an SCSI drive without paying for the Apple logic board upgrade.

Until just as recently, hard disks for the Macintosh were expensive—far more expensive than comparable hard disks for IBM and its myriad of clones. But because of pressure from the top-of-the-line Macintosh Plus and its supporting hard disks, prices for the older technology are falling. That's where the Paradise Mac-20 makes an entrance.

### Cost Effective

Make no mistake—this is an excellent hard disk. Sure, it's not as fast as a hard disk connected via an SCSI port. Or as quick as an internal hard disk. But cost effectiveness is the key here. The suggested retail price for a Paradise

Mac-20 is \$1399, higher even than Apple's Hard Disk 20. But you can buy a Mac-20 through reputable mail order firms for less than \$600. It's a deal a lot of Macintosh owners aren't going to pass up. (Although Paradise makes a 10-megabyte hard drive, you can pay less than 50 percent more for the 20-meg version and get 100 percent more storage.)

### Little Jitters

The Paradise Mac-20 includes the hard disk, its own external power supply, a cable to connect it to the Macintosh, systems and utilities software, and a manual. Setup is easy—just connect the cable to the printer port on the back of the Mac, plug in the drive's power supply, connect the printer cable to the back of the hard disk, insert the floppy disk in the Macintosh, and turn the computer on.

The Mac-20 requires a startup floppy and won't automatically boot when you turn it on. However, the drive turns on when you turn on the Macintosh.

The manual should relieve almost all of the nervous jitters first-time hard disk users seem to have. That's important, for it's only natural to worry about doing something wrong and somehow losing 20 megabytes of data, not just the 400K or 800K on a single 3½-inch disk.

The disk comes preformatted with a single 1000K System volume. Like many other drives, the Mac-20 works with *volumes*, which are analogous to different floppy disks. You use a volume management program to create new volumes and delete old ones. A nice feature is that only those volumes with an asterisk as the first character in their name ap-

pear on the desktop automatically when you boot the drive. Others must be *mounted* or *unmounted* by means of a desk accessory.

Mounting a volume is like putting another floppy in the drive; its programs and files can be accessed. Unmounting is just like ejecting a disk.

If you have the new ROMs installed (you have them if you bought a 512K Enhanced or got the double-sided disk drive upgrade for your Macintosh), every new volume you create will be an HFS volume. HFS (Hierarchical Filing System) lets you create and maintain what are, in effect, sub-directories. HFS makes organizing a hard disk *much* easier.

If you have the old 64K ROMs, you still can use HFS, though you'll have to sacrifice some RAM memory. Place a copy of Apple's HD 20 system file on both the startup floppy and in the same folder as the System on the disk. You can find the HD 20 file on major commercial databases (like CompuServe—it's in MAUG's Mac Developer Forum, in Data Library 8) or from your Apple dealer who should have received the newest update of the file on the same disk as the most recent System [3.2] and Finder [5.3].

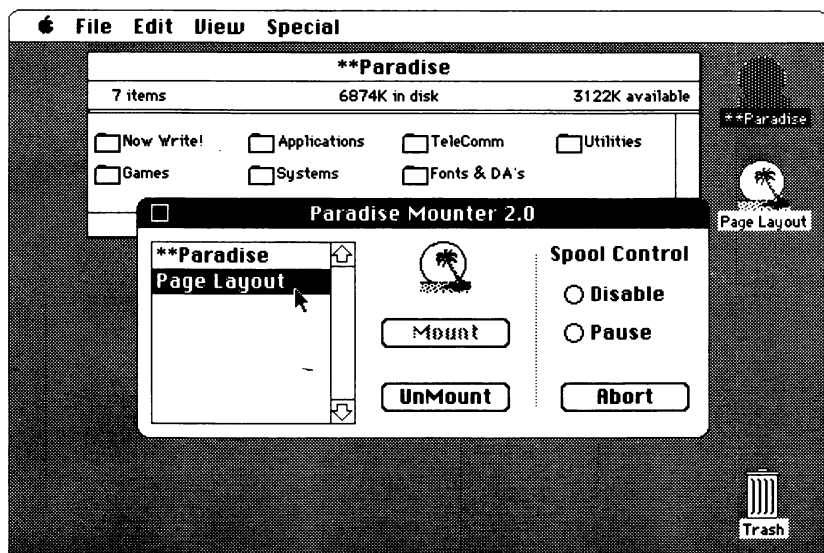
The Mac-20 works just fine with the older (MFS—Macintosh Filing System) flat file structure, too.

### Volumes, Spools, And Caches

When you create a new volume, you assign its size. A volume can be as large as the remaining space on the disk. Thus, if you want, you can create a single volume of over 20 megabytes and run the Mac-20 much like an Apple Hard Disk 20. Or you can create multiple volumes, each 400K. Or anything in between.

Unfortunately, you can't resize a volume once you've created it.





The Paradise Mac-20 hard disk drive comes with a full set of system software utilities, including the Paradise Mounter, a desk accessory which lets you "mount" volumes you've previously created.

That means you tend to create overly large volumes just to be safe, and thus waste some of the disk's space. It will surprise you how quickly you'll fill up the disk, especially if you've been using a Macintosh for any length of time and want most or all of your applications and files at your beck and call.

If you do fill a volume, you have to create one that's larger, copy all files in the old volume to the new, and delete the old volume.

Like many other hard disks, the Paradise has a print-spooling feature that allocates some of the disk's space for temporary storage of printing documents. The data sent to the printer is first moved to this area, freeing the computer much earlier than would happen without a spooler. The spooler is preset at 400K and has a maximum size of two megabytes. But to change the amount of disk space set aside for the spooler means you have to *reformat* the disk. That involves backing up

everything, reformatting the disk, and then restoring the files. That's enough to make anyone think twice about changing the print-spooler space.

Caching software is also included with the disk. These programs let you reserve part of the Macintosh's RAM for frequently used parts of applications, and can speed up operations like quitting and opening. You choose how much memory to reserve. Once set up and working, a cache acts much like a RAM disk, an electronic disk drive. Remember, though, that setting up a cache deducts RAM space that your applications would normally use.

### Worth It

Even with its systems software disadvantages and lack of autoboot, the Paradise Mac-20 is a good deal. The drive is a solid performer. Its fan isn't obnoxiously loud (though not as quiet as Apple's), and since the drive doesn't fit under the Mac, you can

put it out of the way on the floor beside or behind your desk.

If you obtain a copy of Apple's HD 20 system file or have the new ROMs installed, you can run the Paradise under HFS, making your disk easier to organize. Since a volume can be as large as the entire 20 megabytes, you can run with just one volume. That way, you won't have to worry about re-sizing or even volume mounting and unmounting.

Note that the backup software included with the drive works only with MFS at this writing—Paradise has said they will upgrade to HFS-compatibility, but as of now haven't committed to a date.

The Paradise Mac-20 is an excellent way for many Macintosh owners to break into the hard disk world.

### Mac-20

Macintosh 128, 512K, 512K Enhanced, Plus (latter two need special cable)

Paradise Systems

217 East Grand Avenue

South San Francisco, CA 94080

(415) 588-6000

List price: \$1399

# Reviews

## MacGolf

Stephen Levy, Book Editor

You're a Cinderella story—came out of nowhere and the crowd loves you. Now at Augusta National, you're ready to hit the long ball, chip to the green, and sink a 40-foot putt. All that practice is paying off.

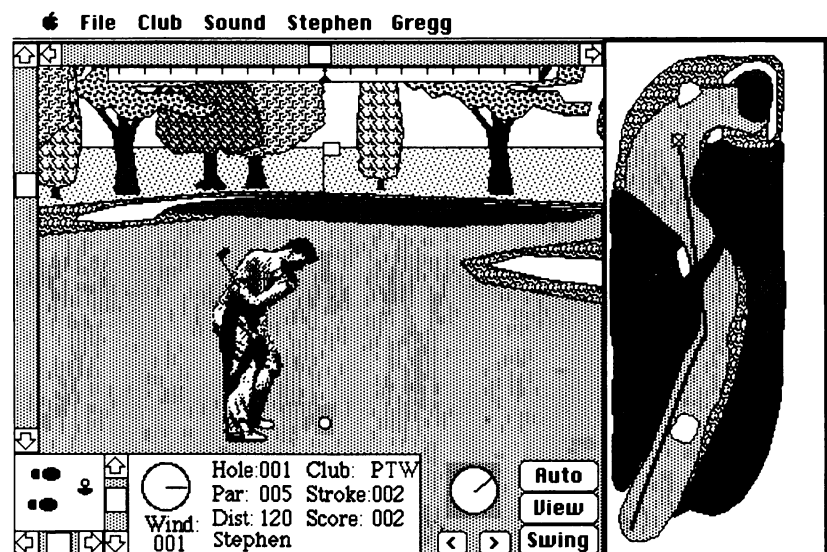
You'll need that practice and more if you plan to master *MacGolf*, a new golf simulation that's amazingly realistic and graphically outstanding. Seasoned golfers will appreciate just how true to life the game plays; newcomers may learn just how much fun golf can be.

Learning to play *MacGolf* is like learning to play real golf. You'll hit plenty of poor shots until you get the feel of the clubs—how far each sends the ball—and how the wind affects the ball's flight. If you hold a low golf handicap, you can use the *MacGolf* clubs just like the real things. But if you never shoot under 110, the clubs probably won't act the way you're used to. Perhaps that's the joy of *MacGolf* for all of us duffers; our physical shortcomings disappear. We can hit a driver 260 yards and make a perfect sand shot. In other words, play like the pros.

*MacGolf* is also for nongolfers. As long as you have a general idea of golf's concepts, you can learn to play a pretty fair game. Just remember that it takes practice.

### The Look And Sound Of It

As you step up for your first shot off the tee, you'll be impressed with the graphics and sound of this game. Everything from the sound of the swing to the cheering of the crowd makes you forget that you're playing a game on your Macintosh. I especially liked the sound of the ball landing in



Using a pitching wedge on the first hole, Stephen goes for a long chip shot as he tries to split two traps and make it to the green. If he makes it, he's on in three. Note the overhead view on the right which shows his first and second shots.

the water—there's no question you've lost it.

The detailed graphics, which create the look of an actual golf course, come at a price. If you're impatient, you may find the time it takes to draw and redraw the screen annoying. The actual drawing is quite fast. However, when the program has to redraw the entire screen for each shot—and also each time you change the direction you want to hit the ball—the delays can get tiresome.

### Playing The Game

*MacGolf* comes with two 18-hole courses. *MacCourses*, a *MacGolf* add-on program which should be available by the time you read this, lets you install four more courses. The courses which come on the *MacGolf* disk, Augusta National and Shinook Hills, should offer you plenty of playtime.

Three levels of play are available, with the difference between levels hinging on wind speeds and the maximum distance a ball can be hit from the rough or sand.

Level 3 can be quite challenging.

As you tee up to begin each hole, the one wood (driver) has been preselected for you. Of course, you can pick another club simply by pulling down the Club menu and making your selection.

The screen is divided into two parts. The right side has an overhead, maplike view of the hole and gives you a fair idea of the hazards. Use this view to decide where to hit the ball.

Changing the direction of any shot is a two-step process. First, change the directional indicator; then click on the View button. The screen is then redrawn to show the new direction you're facing. The map view also indicates exactly where you hit the ball, showing the ball's route as it travels from your club to its safe haven 250 yards closer to the hole—or into the water if you've miscalculated.

The left side of the screen is the view window. Here you see the course from ground level. As you move around the golf course, it's

this view window that adjusts to show where you are at any given time. Even when you overshoot a hole, the view looks back on the fairway you've just traveled.

Once you've decided on a club and the angle of the next shot, you'll need to make a few other adjustments before swinging. Use scroll bars to adjust the ball position and your swing power. Once everything's just right, make sure you've clicked on the View button to install any directional change you might have made. Go ahead and swing at the ball—click on the Swing button and watch. You'll see and hear the golfer go through the perfect swing, with a perfect follow-through. Watch the map view to see how well you've done—watch the ball bounce on the course in the view window.

Just as in real golf, putting looks easier than it is. I was never able to sink a putt from more than four feet away and often missed putts from as close as two feet. I never seemed to get the feel for how hard to hit the ball once on the green. Three- and even four-putting wasn't uncommon.

### Is It Fun?

Golfers, and those who understand the game, will find hours of fun and entertainment here. Nongolfers may lose interest quickly and wonder what all the fuss is about. But if you like computer games and you're ready for the realistic challenge that your Macintosh and *MacGolf* have to offer, this graphic game can offer hours of fun.

*MacGolf*  
Macintosh 512K, 512K Enhanced, Plus  
Practical Computer Applications  
1305 Jefferson Highway  
Champlin, MN 55316  
\$59.95

## Garry Kitchen's GameMaker: The Computer Game Design Kit

Selby Bateman, Features Editor

Activision's *GameMaker* is a remarkable combination of elements: an absorbing and educational program development tool that's also an engaging and enjoyable game package. Just reading about the many features included in *GameMaker* can give you some idea of why it has already become such a popular program. But only after you've worked directly with the package will you realize just how much this software has to offer.

At a time when most computer entertainment packages are insulating the user from the internal elements of design, *GameMaker* is based on the premise that non-programmers ought to have the power to actually design and produce their own games. The program asks the user to look underneath all of the flashing colors, moving figures, music, and sound effects to determine what's going on. *GameMaker* does this by employing a user interface that's as informative to the non-programmer as it's powerful. By the same token, *GameMaker* is definitely not something to pick up and master within an hour, or even a day. There's a great deal going on here and much to learn. But if you've ever yearned to try creating your own games, *GameMaker* is worth the time and effort.

### Divisions Of Labor

*GameMaker* contains four major integrated divisions of labor: SceneMaker, SpriteMaker, SoundMaker, and MusicMaker, as well as a general Editor program. Each of these program builders ultimately works with the others to

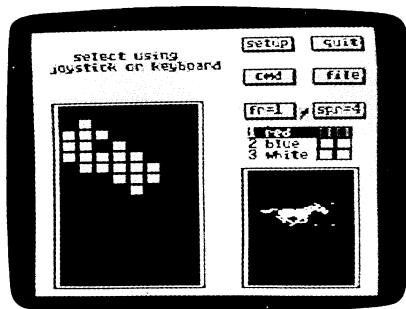
help you create an entire game. The *GameMaker* software also includes almost a dozen ready-to-run games on disk as well as a variety of preprogrammed sprites, scenes, sounds, and music that help you learn as you go. If at any stage you need to take a breather, just play one of the games. You can also take the opportunity to study the program line by line, and make any changes with the editor programs as you learn more about creating the components of a game.

The Apple version of *GameMaker* is contained on a floppy disk (on both sides of one program disk). The software can be accessed from the keyboard or with a joystick. The games you create with *GameMaker* are yours to do with as you will, and can run independently of the main program.

When first using *GameMaker*, you'll find yourself in the main Editor section. This screen contains a central area which displays program listings and can be scrolled up and down. There are also command boxes for Menu, which will let you go to any of the scene, sprite, sound, and music editors; File, where you can load, save, initialize a disk, delete a file, print the program, or make a disk; Clear, to erase a program listing; Run, to start a program; Insert, to add space in the program area for inserting something; Delete, for removing a part of the program; Find, which will help you locate a section of the program; and Copy, to duplicate one or more lines of the program.

As you can see, the main Editor is full of powerful command

# Reviews



Creating an animated horse with the SpriteMaker editor in GameMaker.

options. Although getting comfortable with it takes a little time, the layout of the menu options makes the effort intuitive and not cumbersome. That's good, because this is where you'll eventually put together all of the pieces of the game that you've designed with the different editors.

Even with the well-designed Editor layout, coordinating the different parts of the program could be intimidating if it weren't for a very helpful section of the manual where game designer Garry Kitchen takes you step by step through just such a procedure. Not only is this Advanced Game Design section easy to follow, but Kitchen has also included many game design tips that are valuable to a novice game creator.

## Setting The Scene

Each of the editor divisions uses the same type of command menu system that you encounter in the main Editor. In SceneMaker, for example, you're presented with four main commands: File, Undo, Clear, and Quit. There are drawing mode tools: Zoom, Circle, Line, Copy, View, Draw, Fill, Box, and Move. Also visible are six different colors for you to use in creating the background scenes for your games.

Essentially, SceneMaker is a miniature paint program allowing you to experiment with any

scenes you wish. There are even helpful hints in the manual on which colors to use together for the best effect onscreen. In practice, you'll find that creating detailed areas of a scene is best done using the Zoom mode with another drawing tool. This ability to combine certain drawing tools is another nice design touch in GameMaker.

## Sprites And Sounds

The SpriteMaker editor is another nicely designed element of *GameMaker*. Here, you can build the animated objects that will go into your games. As with SceneMaker, you can start from scratch or load one of the predesigned sprites from disk.

You create your sprites on a screen similar to the other game editors. There's a drawing board on which to place your sprites, a sprite positioning area, and a collection of command boxes and available colors. You can place the various sprites where you want them just by moving them with the joystick or cursor keys.

SoundMaker is one of the most visually interesting and aurally entertaining of the editors within *GameMaker*. You're presented with a screen that contains a familiar command window at the top, but the rest of the screen is a grid of dials and sliders that alter the sounds for your games. For example, the waveform dial gives you the options of pulse, slide, or noise waveforms. There are also options for repeating sounds and for deciding the speed of the sound, the frames to use for your sounds, and the high and low frequencies. You can test the sounds before you save them for use in your game.

## Music And More

The MusicMaker is the final major

editing area. With it, you compose any background music you might want to go along with your game. There are preprogrammed songs or you can start from the beginning.

The screen presents you with a piano-style keyboard at the top, a music sheet and musical staff, instrument selectors, a note selection box, and a command field. When you choose to load a preprogrammed piece of music from disk, the MusicMaker will not only play it for you, but will also display the notes on the music sheet. This is of great benefit if you've never before tried your hand at composing music.

The enjoyment and the benefits of the program are at the fullest when you spend enough time with the software to really understand what's occurring. The feeling of creative control that you find when you do this is well worth the time spent.

It should be added that Activision has already announced it's making available add-on library disks for use with *GameMaker*, probably by the time you read this. The first libraries will contain additional tools designed especially for sports and science fiction games. More libraries are planned for later release.

As the *GameMaker* manual says, this program is designed for experimentation, creativity, and fun. Happily, Activision's *GameMaker* lives up to all three of its promises.

Garry Kitchen's *GameMaker*:  
The Computer Game Design Kit  
Apple II-series computer with 64K  
minimum; joystick optional  
Activision  
2350 Bayshore Frontage Rd.  
Mountain View, CA 94043  
\$49.95



# Apple User Groups

Once again, COMPUTE!'s Apple Applications Special is pleased to publish the most current Apple user group list, compiled and provided by Apple Computer, Inc. Of course, changes continue (and will continue) to occur in the approximately 800 user group listings printed here. Apple wishes to extend its apologies for any errors which may appear.

In its raw form, Apple's user group information included phone numbers, officer names, meeting places, and meeting times. However, we've decided to publish only the most permanent data—the group name and its mailing address. After all, officers change, meeting places shift, and phone numbers are disconnected. Though this may make it more difficult for some to locate the nearest user group, we feel the information here will be useful to more people, and for a longer period of time.

Please send any corrections, additions, deletions, or requests for further user group information to Ellen Petry Leanse, Apple User Group Evangelist, Apple Computer, Inc., 20525 Mariani Ave., Mail Stop 23G, Cupertino, CA 95014.

The following user group listing is organized alphabetically by state. Within each state, groups are listed by ZIP code.

## ALABAMA

**Forest Resources Institute**  
201 N Pine St, #24  
Florence, AL 35630

**Quad Cities Apple Byters**  
129 E Oak Hill Dr  
Florence, AL 35630

**Huntsville Macintosh Users Group**  
815 Esslinger Rd  
Huntsville, AL 35802

**Newton's Tree Apple User Group**  
3714 Lakewood Cir  
Huntsville, AL 35811

**Peanuts And Apples**  
Rt 2, Box 100  
Ozark, AL 36360

**Sapple**  
PO Box 8894  
Mobile, AL 36689

**TAG**  
Box 330  
Auburn, AL 36830

## ALASKA

**Eureka Springs Apple Users**  
Rt 4, Box 554  
Eureka Springs, AK 72632

**Anchorage Macintosh User Group**  
200 W 34th Ave, Ste 202  
Anchorage, AK 99503

**Anchorage Apple User Group**  
PO Box 110753  
Anchorage, AK 99511

**Nome Public Schools**  
PO Box 131  
Nome, AK 99762

**Sitka Apple Users Group**  
1702 Halibut Point Hwy  
Sitka, AK 99835

## ARIZONA

**Arizona Apple User Group**  
3035 E Topaz Cir  
Phoenix, AZ 85028

**MacExplorers—Phoenix**  
C/O APSCO  
PO Box 21666 M/S 6079  
Phoenix, AZ 85036

**Mesa Mac Group**  
Mesa Computer Mart  
1153 E Main St  
Mesa, AZ 85203

**Arizona Macintosh Users Group**  
16427 East Campbell  
Gilbert, AZ 85234

**Gilbert Apple Seeds**  
33 W Palo Verde St  
Gilbert, AZ 85234

**AMUG**  
PO Box 28120  
Tempe, AZ 85282

**Yuma Apple User Group**  
1832 W 3rd Pl  
Yuma, AZ 85364

**Gila Valley Apple Growers Association**  
PO Box 809  
Thatcher, AZ 85552

**Mountain View Apple Users**  
1932 Viola Dr  
Sierra Vista, AZ 85635

**Tucson Apple Core**  
3629 N Cavallero Pl  
Tucson, AZ 85705

**Tucson Apple Users Group**  
Pima College  
2202 W Anklam Rd  
Tucson, AZ 85709

**Tucson Apple Core**  
4620 E Timrod St  
Tucson, AZ 85711

**Apple C.A.R.T.**  
PO Box 2361  
Page, AZ 86040

**Oak Creek Apples**  
150 Color Cove Rd  
Sedona, AZ 86336

## ARKANSAS

**Apple Access**  
1855 N W Ave  
El Dorado, AR 71730

**Apple Addicts**  
PO Box 55217  
Little Rock, AR 72205

**Fayetteville Apple Users Group**  
PO Box 204  
Fayetteville, AR 72702

**City Heights Appleblossoms**  
301 Mt Vista Ave  
Van Buren, AR 72956

## CALIFORNIA

**Mac Buddhist**  
933 S New Hampshire Ave  
Los Angeles, CA 90006

**UCLA Macintosh Users Group**  
UCLA Graduate School of Education  
Los Angeles, CA 90024

**Los Angeles MUG**  
12021 Wilshire Blvd, #405  
W Los Angeles, CA 90025

**LA Macintosh Group**  
4026 Garden Ave  
Los Angeles, CA 90039

**LA Apple Users Group**  
9513 Hindry Pl  
Los Angeles, CA 90045

**Mac Buddhist LA**  
2605 N Beachwood Dr  
Los Angeles, CA 90068

**Lisa Club Of LA**  
854 N Croft Ave  
Los Angeles, CA 90069

**Northrop Macintosh Users Group**  
Northrop 4550/82  
Hawthorne, CA 90250

**Nereid Systems**  
2417 John St  
Manhattan Beach, CA 90266

**TRW Apple Users Group**  
M/S-2565  
1 Space Park  
Redondo Beach, CA 90278

**Original Apple Corps**  
15 Paloma Ave, #24  
Venice, CA 90291

**Citicorp Apple Users Group**  
3100 Ocean Park Blvd  
M/S V6  
Santa Monica, CA 90405

**Apple Jacks**  
4818 Reese Rd  
Torrance, CA 90505

**Macbug**  
13800 Biola Ave  
La Mirada, CA 90639

**Logic Tree Mac Users Group**  
10512 Los Vagueros Circle  
Los Alamitos, CA 90720

**Oily Apples**  
3021 Copa De Oro  
Los Alamitos, CA 90720

**Logic Tree Mac Users Group**  
3560 Bluebell  
Seal Beach, CA 90740

**Mac-hackers**  
21111 Dolores, #146  
Carson, CA 90745

**Mesa Apple Computer Club**  
21111 Dolores, #146/8  
Carson, CA 90745

**Arco Users Group**  
Arco Transportation  
Long Beach, CA 90802

**Douglas Aircraft**  
3855 Lakewood Blvd  
M/S 120-40, Long Beach  
CA 90846

**Apple Electrosystems**  
533 Bradoaks Ave  
Monrovia, CA 91016

**San Gabriel Valley Mac Users Group**  
PO Box 792  
Sierra Madre, CA 91024

**JPL Apple Computer Club**  
M/S 179-206  
Pasadena, CA 91109

**JPL Mac User Group**  
4800 Oak Grove  
Pasadena, CA 91109

**Lerc Aces**  
3711 La Crescenta Ave  
Glendale, CA 91208

**Pyrus Malis**  
3309 Sparr Blvd  
Glendale, CA 91208

**Tri-Net Work Apple Users Group**  
8041 Sadring  
Canoga Park, CA 91304

**Apple/Valley Computer Club**  
4900 Newcastle  
Encino, CA 91316

**Apple PI**  
1033 Stoneshead Ct  
Westlake Village, CA 91361

**Conejo Valley Macintosh User Group**  
3637 Thousand Oaks Blvd  
Westlake Village, CA 91362

**Rockwell Science Center Computer**  
PO Box 1085  
Thousand Oaks, CA 91360

**Transaction Technology**  
1945 Berkshire Dr  
Thousand Oaks, CA 91362

**Mac Valley Users Group**  
PO Box 4297  
Burbank, CA 91503

**Lerc Aces**  
PO Box 551  
Burbank, CA 91520

**Dick Grove School Of Music Users Group**  
12754 Ventura Blvd  
Studio City, CA 91604

**Mac Mania**  
963 Nottingham Dr  
Corona, CA 91720

**East Valley Apple Club**  
315 C Diamond Bar Blvd  
Diamond Bar, CA 91765

**Mt. San Antonio College Library**  
1100 N Grand Ave  
Walnut, CA 91789

**Super Group One**  
2521½ S Vista Wy, #232  
Carlsbad, CA 92008

**San Diego Macintosh Users Group**  
PO Box 12561  
La Jolla, CA 92037

**USUS**  
PO Box 1148  
La Jolla, CA 92038

**North County Computer Club**  
PO Box 4442  
Oceanside, CA 92054

**Apricorn**  
7050 Convoy Ct  
San Diego, CA 92111

**Demons**  
630 Cabrillo Ave  
Coronado, CA 92118

**San Diego Mensa Users Group**  
6030 Fennell Ave  
San Diego, CA 92114

**San Diego Medical Apple Users**  
7920 Frost St 405  
San Diego, CA 92123

**Apple Corps Of San Diego**  
PO Box 87964  
San Diego, CA 92138

**San Diego Macintosh Users Group**  
PO Box 81444  
San Diego, CA 92138

**MacDesert Connection**  
255 N El Cielo Rd, Ste 629  
Palm Springs, CA 92262

**Mac Desert User's Group**  
36953 Haywood Ave  
Barstow, CA 92311

**March Apples**  
11563 Triumph Ln  
Moreno Valley, CA 92388

**Empire Mac User Group**  
33418 Rosemond  
Yucaipa, CA 92399

**Apple Jacks**  
2836 N G St  
San Bernardino, CA 92405

**Apple Computer Users Group**  
127 Glenfair Ln  
San Bernardino, CA 92407

**U Of C Riverside Mac User Group**  
290 W Big Springs Rd, Apt #W  
Riverside, CA 92507

**Ground Systems Group**  
PO Box 3310  
Fullerton, CA 92634

**HFEA Macintosh Users Group**  
1901 W Malvern Ave  
Fullerton, CA 92635

**Orange Apple Computer Club**  
25422 Trabuco Rd  
El Toro, CA 92630

**MacBeach User Group**  
PO Box 2178  
Huntington Bch, CA 92647

**McDonnell Douglas Apple User**  
20262 Wind Cave Ln  
Huntington Bch, CA 92646

**McDonnell Douglas Astronautics**  
5301 Bolsa Ave  
Huntington Bch, CA 92647

**North Orange Computer Club**  
11121 Vinevale  
Garden Grove, CA 92641

**Orange Apple MUG**  
17661 Falkirk Ln  
Huntington Beach, CA 92649

**Saddleback Apple User Group**  
24509 Los Alisos, #105  
Laguna Hills, CA 92653

**Honeywell**  
1800 E Miraloma Ave, Ste A  
Placentia, CA 92670

**JPL Computer/Apple Club**  
24575 Spartan St  
Mission Viejo, CA 92691

**Mac Orange**  
PO Box 1830  
Santa Ana, CA 92702

**McDonnell Douglas Astro Apple**  
1668 Mt Darwin Cir  
Fountain Valley, CA 92708

**Realtors Mac User Group**  
18023 Sky Park Cir F-2  
Irvine, CA 92714

**HAC Apple Computer Group**  
417 Meadowbrook Pl  
Anaheim, CA 92801

**HFEA Apple Computer Users Group**  
417 Meadowbrook Pl  
Anaheim, CA 92801

**South Orange County Computer Club**  
211 S State College 134  
Anaheim, CA 92806

**Appleholics Anonymous**  
8357 Edison Dr  
Ventura, CA 93001

**Ventura County Mac Club**  
1413-D S Victoria Ave  
Ventura, CA 93003

**Conejo/Ventura Mac Users Group**  
PO Box 7754  
Oxnard, CA 93031

**Santa Barbara Apple User Group**  
C/O Activities Planning Ctr  
Santa Barbara, CA 93106

**South Coast Mac User Group**  
PO Box 2035  
Goleta, CA 93118

**Sequoia Computer Users**  
216 E Colonial Dr  
Hanford, CA 93230

**Apple BUG**  
4509 Millbrook Wy  
Bakersfield, CA 93309

**Macadamia**  
90 W Hway 246  
Buellton, CA 93427

**Santa Maria & Lompoc Apple User**  
265 Shirley Ln  
Santa Maria, CA 93455

**Ridgecrest Apple Group**  
Star Route  
PO Box 109E

Inyokern, CA 93527

**Hi Desert Apple Computer Club**  
904 W Lancaster Blvd  
Lancaster, CA 93534

**Ridgecrest Apple User Group**  
236 Primrose St  
Ridgecrest, CA 93555

**Sierra Apple Orchard**  
PO Box 16275  
Fresno, CA 93755

**Club Mac Of Monterey**  
PO Box 222988  
Carmel, CA 93922

**Navy Postgrad School AUG**  
1290 Spruance Rd  
Monterey, CA 93940

**The Peninsula Lisa Users Group**  
PO Box 626  
Moss Beach, CA 94038

**Pen-Apple**  
PO Box 482  
San Carlos, CA 94070

**Lockheed Employees Apple Users Group**  
PO Box 61837  
Sunnyvale, CA 94088

**Omni MUG**  
548 S Fair Oaks, #1  
Sunnyvale, CA 94086

**Bank Of America Mac User Group**  
315 Montgomery St, 12th Floor  
San Francisco, CA 94105

**Pacific Bell MUG**  
370 3rd St, Rm 753A  
San Francisco, CA 94107

**Show Page Mac Users Group**  
2040 Polk Street, #340  
San Francisco, CA 94109

**Peninsula Lisa Users Group**  
214 California St  
San Francisco, CA 94111

**Mac West**  
1077 Vallejo  
San Francisco, CA 94133

**San Francisco Apple Core**  
1515 Sloat Blvd, #2  
San Francisco, CA 94132

**SPACE**  
PO Box 1257  
Palo Alto, CA 94302

**Stanford Macintosh User Group**  
PO Box 6508  
Stanford, CA 94305

**Diablo Valley Apple User Group**  
PO Box 5031  
Concord, CA 94524

**MOUSE**  
2198 Vista Luna  
Fairfield, CA 94533

**SPC Apple**  
PO Box 8019  
Fremont, CA 94537

**Abacus User Group**  
2850 Jennifer Dr  
Castro Valley, CA 94546

**San Leandro Apple Eaters**  
26910 Lauderdale Ave  
Hayward, CA 94545

**Apple User Group**  
1158 Bayview Ave  
Napa, CA 94558

**East Bay Macintosh Users Group**  
C/O Pinole Library  
Pinole, CA 94564

**San Leandro Apple Eaters Users Group**  
San Leandro HS  
San Leandro, CA 94577

**Napa Apple User Group**  
PO Box 6801  
Napa, CA 94581

**Tri Valley Apple User Group**  
9814 Davona Dr  
San Ramon, CA 94583

**Apple Creek**  
1815 Ygnacio Valley Rd  
Walnut Creek, CA 94598

**Mills College MUG**  
5000 Macarthur Blvd  
Oakland, CA 94613

**Berkeley Macintosh User Group**  
1442-A Walnut St, #62  
Berkeley, CA 94709

**Macs Of Marin Users**  
973 Grand Ave  
San Rafael, CA 94901

**San Francisco Apple Lisa Club**  
PO Box 538  
Fairfax, CA 94930

**Apple III Users Of Northern California**  
Box 184  
Mill Valley, CA 94941

**North Coast Mac Users**  
503 Marylyn Cir  
Petaluma, CA 94952

**Apple Computer**  
20525 Mariami Ave  
M/S 23G  
Cupertino, CA 95014

**Apple Library Users Group**  
10381 Bandlely Dr, #8C  
Cupertino, CA 95014

**Apple PIE**  
PO Box 2185  
Santa Clara, CA 95055

**Association Of Apple 32 Users**  
PO Box 634  
Santa Clara, CA 95052

**Santa Cruz Apple Group**  
PO Box 1428  
Santa Cruz, CA 95061

**International Apple Core**  
2278 Trade Zone Blvd  
San Jose, CA 95131

**ABUG Apple Blossom User Group**  
PO Box 53323  
San Jose, CA 95153

**Stockton Apple User Group**  
4948 Virtue Ave, #335  
Stockton, CA 95207

**Stanislaus Apple User Group**  
PO Box 741  
Modesto, CA 95353

**Applepickers II Of Sonoma County**  
738 B Slater St  
Santa Rosa, CA 95404

**Sequoia Macintosh Users Group**  
PO Box 4623  
Arcata, CA 95521

**Auburn Macintosh Users Group**  
11517 F Ave  
Auburn, CA 95603

**Davis Apple User Group**  
PO Box 1534  
Davis, CA 95617

**NABVICU**  
PO Box 1352  
Roseville, CA 95661

**Roseville Apple Core**  
PO Box 1377  
Roseville, CA 95661

**SAC MUG**  
PO Box 163058  
Sacramento, CA 95816

**Apple Sac**  
5816 Corte Leone Wy  
Sacramento, CA 95842

**Apple World**  
6611 Linville Dr  
Weed, CA 96094

**Trinity Users Group**  
Rt 2, Box 4792  
Trinity Center, CA 96091

## COLORADO

**Computers Applied To Arts Education**  
Box 561  
Broomfield, CO 80020

**Apple Three User Group**  
6818 S Magnolia Ct  
Englewood, CO 80112

**Apple Pi Users Group**  
PO Box 17467  
Denver, CO 80217

**Computer Cache**  
PO Box 24869  
Denver, CO 80224

**The Appleworks Users Group**  
TAWUG  
Denver, CO 80224

**Boulder Macintosh Meeting**  
6727 Lakeview Dr  
Boulder, CO 80303

**University Of Colorado MUG**  
3161 Madison, #Q212  
Boulder, CO 80303

**Greeley Outpost Club Mac**  
1955 23rd Ave  
Greeley, CO 80631

**Apple Mountain**  
25 E Sommerlyn Rd, #407  
Colorado Springs, CO 80906

**South Colorado Apple Users**  
311 N Main  
Pueblo, CO 81005

**Apple Seeds**  
13579 6700 Rd  
Montrose, CO 81401

**Macintosh Users Group**  
Box 1146  
Basalt, CO 81621

**Silicon Mountain Mac Users Group**  
2457 Sunnywood Ave  
Woodland Park, CO 90863

## CONNECTICUT

**Informatics Group**  
80 Shield St  
West Hartford, CT 06110

**HUGE Apple Club**  
PO Box 18027  
East Hartford, CT 06118

**University of Connecticut Macintosh User's Group**  
C/O Dept Of Molecular & Cell Biology  
Storrs, CT 06268

**Southeastern Connecticut Apple User Group**  
PO Box 510  
Gales Ferry, CT 06335

**Applefield Users Group**  
565 Longhill Rd  
Groton, CT 06340

**Southern Connecticut Mac User**  
269 Thames St  
Groton, CT 06340

**SECAUG**  
17 Corey Ln  
Niantic, CT 06357

**Appleshare**  
PO Box 200  
Greens Farms, CT 06436

**Shoreline Apple Club**  
400 Livingston St  
New Haven, CT 06511

**Macforth Users Group**  
3081 Westville Station  
New Haven, CT 06515

**The Yale Mac Users Group**  
PO Box 220  
Yale Station  
New Haven, CT 06520

**Applelist**  
PO Box 8235  
New Haven, CT 06530

**Apple III Society Of Southern Connecticut**  
34 Burr School Rd  
Westport, CT 06880

**Apple MUGS**  
7 Old Wagon Rd  
Wilton, CT 06897

**T.H.E. Group**  
1372 Summer St  
Stamford, CT 06905

**DELAWARE**

**Grape**  
PO Box 8904  
Newark, DE 19711

**Macintosh Users Of Delaware**  
PO Box 161  
Rockland, DE 19732

**Delmarva Apple Users Group**  
Rt 2, Box 94A  
Bridgeville, DE 19933

## FLORIDA

**Daytona Beach Apple Users Group**  
108 Wellington Dr  
Daytona Beach, FL 32019

### Apple-Jax

9455 Lita Rd W  
Jacksonville, FL 32217

### North Florida Macintosh

PO Box 10286  
Jacksonville, FL 32247

### Pensacola Apple Data Association

PO Box 15048  
Pensacola, FL 32514

### Pensacola Apple Users Group

8435 Lofton Dr  
Pensacola, FL 32514

### Fort Walton Beach Apple Users

137 Hospital Dr, #A  
Fort Walton Beach, FL 32548

### Macintosh Users Group

924 Holbrook  
Fort Walton Beach, FL 32548

### Suffolk Apple Computer Society

506 Greenwood Cove S  
Niceville, FL 32578

### Apple Tree Of Central Florida

732 Sybilwood Cir  
Winter Springs, FL 32708

### Valencia Community College

PO Box 3028  
Orlando, FL 32802

### O-Mac

3716 Ridgemont Rd  
Orlando, FL 32808

### Mac Mad

PO Box 194  
Melborne, FL 32902

### Space Coast Apple User Group

PO Box 2112  
Merritt Island, FL 32952

### Key West Macintosh Users Group

Florida Keys Community College  
Key West, FL 33040

### A.C.E.S.

PO Box 9222  
Coral Springs, FL 33065

### Gold Coast Mac User Group

3250 Mary St, Ste 305  
Miami, FL 33133

### MIAUG

5701 Collins Ave, #1709  
Miami Beach, FL 33140

### National XLisa Users Group

PO Box 450676  
Miami, FL 33145

### MAUG

2300 NW 135 St  
Miami, FL 33167

### SMAUG

10201 Fontainebleau  
Miami, FL 33172

### Gold Coast Mac User Group

PO Box 26270  
Fort Lauderdale, FL 33320

### Aces

PO Box 291557  
Fort Lauderdale, FL 33329

### Apple Expert

2786 Tennis Club Dr, #305  
West Palm Beach, FL 33409

### Sun Coast Apple Club

762 Oakview Dr  
Bradenton, FL 33507

### Suncoast Apple Tree

PO Box 7488  
Clearwater, FL 33518

### Bay Area Macintosh Users Group

PO Box 78  
Crystal Beach, FL 33523

### Sun Coast Apple Club

742 Sorrento Inlet  
Nokomis, FL 33555

### Sarasota Manatee MUG

PO Box 25134  
Sarasota, FL 33579

### Bay Area Macintosh User Group

14011 E Parsley Dr  
Madeira Beach, FL 33708

### Polk Apple Core

PO Box 1562  
Lakeland, FL 33801

### SWACKS

Rt 2, Box 607  
N Fort Myers, FL 33903

### Magic

408 Somerset Ave  
Sarasota, FL 34243

## GEORGIA

### Mac Atlanta

3127 Bunker Hill Cir  
Marietta, GA 30062

### Sea

3258 Powers Ferry Rd  
Marietta, GA 30067

### Atlanta Macintosh Users Group

3736A Westchase  
Norcross, GA 30092

### La Mug

824 Azalea Dr  
La Grange, GA 30240

### Widget Apple Group

1914 Plantation Rd  
Lawrence, GA 30245

### Atlanta Area Apple Users Group

365 Arizona Ave NE  
Atlanta, GA 30307

### Apple Pie Neers User Group

675 W Peachtree St, #37A95  
Atlanta, GA 30375

### Mac Users Group Of Athens

175 Baxter Dr 1-2  
Athens, GA 30606

### Classic Apple Users Group

2211 Belmont Rd  
Arnoldsville, GA 30619

### Amigos

PO Box 301  
Fort Valley, GA 31030

### Savannah Apple Core

1525 Spalding Rd  
Savannah, GA 31406

### Savannah MUG

13 Cutler Ct  
Savannah, GA 31419

## HAWAII

### Kauai Apple Users Group

PO Box 443  
Hanalei, HI 96714

### Maui Macintosh User Group

RR 1, Box 98  
Wailuku, HI 96793

### H.A.U.S.

PO Box 91  
Honolulu, HI 96810

### Hawaii Macintosh Users Group

PO Box 75537  
Honolulu, HI 96836

## IDAHO

### Apple User Group

1824-B Main St  
Lewiston, ID 83501

### Caldwell Apple Users Group

316 W Elm St  
Caldwell, ID 83605

### Apple Boise User Group

PO Box 15308  
Boise, ID 83715

### Northern Idaho Macintosh Users Group

1157 4th St  
Saint Maries, ID 83861

## ILLINOIS

### Apple Developers Consortium

703 W Victoria Ln  
Arlington Heights, IL 60005

### NIAUG

105 S Ridge Ave  
Arlington Heights, IL 60005

### Apple People

PO Box 333  
224 N Main St  
Crystal Lake, IL 60014

### Macadamia

PO Box 333  
Crystal Lake, IL 60014

### Apples Franks & Friends

33453 Greentree Rd  
Wildwood, IL 60030

### Searle Apple User Group

4901 Searle Pkwy  
Skokie, IL 60077

### Waukegan Apple Users Group

PO Box 8913  
Waukegan, IL 60079

### Plato Center Apple Users Group

Rt 2, Box 189  
Elgin, IL 60120

### Bird Apple Users

1113 Wheaton Oaks Dr  
Wheaton, IL 60187

### Northwestern-Mouse User Group

627 Dartmouth Pl  
Evanston, IL 60201

### Northwestern University Apple II

Dept N & P, Hogan Hall  
Evanston, IL 60201

### Apple Enthusiast Society Of Oak Park

820 Bonnie Brae  
River Forest, IL 60305

### Apple Tree Computer Club

1544 Edgewood Ave  
Chicago Heights, IL 60411

### Illinois Macintosh Users Group

2314 Mason  
Joliet, IL 60435

### Lasalle County Station AUG

1336 Liberty St  
Morris, IL 60450

### Aurora Area Apple Core

PO Box 2805  
Aurora, IL 60507

### Dupage Apple Users Group

PO Box 294  
Downers Grove, IL 60515

### Apple Tree Users Group

Bell Labs  
Naperville-Wheaton Rd  
Naperville, IL 60566

### American Bar Association

30 North La Salle, #3524  
Chicago, IL 60602

### The Rest Of Us Users Groups

1030 N State St, #33L  
Chicago, IL 60610

### American Bar Association Macintosh Users

750 N Lake Shore Dr  
Chicago, IL 60611

### Chicago South Side Mac Users Group

5737 S University Ave  
Chicago, IL 60637

### Kankakee Area Apple Users

Rt 4, Box 278  
Kankakee, IL 60901

### Central Illinois Apple Users Group

1501 W Bradley Ave  
Peoria, IL 61625

### Apple Users Group Of Bloomington

PO Box 879  
Bloomington, IL 61702



**Champaign Urbana Apple Users Group**

1908 Barberry Cir  
Champaign, IL 61821

**Danville Area Apple Compatible**

220 Cedar  
Danville, IL 61832

**Edgar County Apple User Group**

25 Briar Hill Rd  
Paris, IL 61944

**Metro East Computer Association**

255 H Pointe Pl  
East Alton, IL 62024

**Gateway Area Macintosh Users Group**

PO Box 7  
Edwardsville, IL 62025

**Decatur Apple Club**

2061 W Division  
Decatur, IL 62526

**Capital Apples**

409 Avondale Dr  
Springfield, IL 62704

**Macintosh Users Group Of Sanga**

623 S Walnut St  
Springfield, IL 62704

**Crab Apples**

PO Box 338  
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**Crab Apples**

PO Box 437  
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**Little Egypt Apple Users Group**

PO Box 1122  
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**INDIANA****Eli Lilly & Company Apple User Group**

4321 Jasmine Wy  
Greenwood, IN 46142

**The Apple Pickers**

PO Box 20136  
Indianapolis, IN 46220

**North Indiana Apple User Group**

930 High Ridge Dr  
Schererville, IN 46375

**Mac Genius**

504 Burlington Beach Rd  
Valparaiso, IN 46383

**Apple Us Michinia**

423 W Bike  
Bremen, IN 46506

**Mad Macs**

523 Flanner Hall  
Notre Dame, IN 46556

**The C.L.U.B./P.O. Reidenbach**

Bendix Aircraft  
South Bend, IN 46624

**Fort Wayne Apple Computer User Group**

PO Box 11507  
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**CAUG**

2805 Chestnut Ct  
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**SMUG**

PO Box 1238  
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**Southern Indiana Apple Users**

7623 Ridgeway Ave  
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**Apple Byters Of Virgo County**

2747 College Ave  
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Beacon Elect-213 Lincoln Wy  
Ames, IA 50010

**Apple Seed**

PO Box 1281  
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**Helix User Service**

3511 Sheridan Ave  
Des Moines, IA 50312

**Club Mac Midwest**

6904 Hopkins Rd  
Des Moines, IA 50322

**Agri-Cursors**

C/O Sac City St  
500 Audobon  
Sac City, IA 50583

**The Tree House**

219 W Montgomery  
Creston, IA 50801

**Bytes Chips & Cores**

3303 Rebecca St  
Sioux City, IA 51104

**Crawford County Computer Club**

Crawford County Courthouse  
Denison, IA 51442

**Western Iowa Apple Users**

RR 4, Box 96  
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**Tristate Micro Computer**

1866 Carter Rd  
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**Jones County Micro Computer Users**

RR 3  
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**Iowa City Apple Group**

PO Box 1267  
Iowa City, IA 52240

**Cedar Rapids Apple Users Group**

295 S 19th St  
Marion, IA 52302

**Macintosh User Group**

Rt 2, Box 188-A  
Solon, IA 52333

**Macknowlia**

PO Box 427  
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**Apple Burlington Users Group**

PO Box 508  
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**Apple Byters**

599 1st Ave  
Durant, IA 52747

**The Green Apples**

1432 Cedar St  
Davenport, IA 52804

**KANSAS****Apple Bits Users Group**

PO Box 368  
Mission, KS 66201

**Apple Bits**

6140 Glenwood  
Mission, KS 66202

**Open Apple**

PO Box 7651  
Overland Park, KS 66207

**Applebutter**

10049 Santa Fe Dr  
Overland Park, KS 66212

**Kaw River Mac Users Group**

PO Box 454  
Manhattan, KS 66502

**The Association Of Landlords Of Kansas**

PO Box 732  
Topeka, KS 66601

**Topeka Area Apple Group**

805 SE 27th  
Topeka, KS 66605

**Topeka Apple Users Club**

911A SW 37th St  
Topeka, KS 66611

**Peoplelink Apple User Group**

1614 E Fortuna  
Wichita, KS 67216

**Jennings Computer User Group**

PO Box 102  
Jennings, KS 67643

**Dodge City Apple Users Club**

606 2nd St  
Dodge City, KS 67801

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PO Box 19  
Eastwood, KY 40018

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10211 Foxboro Dr  
Louisville, KY 40223

**Apple-Siders (Cincinnati)**

27 Crystal Lake Dr  
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1751 Karen Cir  
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**Quacks Club**

307 Adams Ave  
Hopkinsville, KY 42240

**LOUISIANA****Club Mac Of M.O.**

111 Atherton Dr  
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**Crescent City Apple Core**

72 Old Hickory Ave  
Chalmette, LA 70043

**New Orleans Macintosh Users Group**

2334 New York St  
New Orleans, LA 70122

**Vermilion Apple Computer Club**

1305 Senior High Dr  
Abbeville, LA 70510

**Baton Rouge MAUG**

Center For Wetland Resources  
Baton Rouge, LA 70803

**Red River Maclan**

2326 Barksdale Blvd, #10  
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PO Box 1829  
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1032 Tranquility Dr  
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**Main Mac Owners & Operator Society**

54 Ivanhoe Dr  
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**Gould Academy**

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10 Lloyd Rd  
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**Apple-Users In Maine Schools**

112 Maine St  
Farmington, ME 04938

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PO Box 398  
Lexington Park, MD 20653

**The Technokinetic Council**

113 Galatea St, Dept M  
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Laurel, MD 20707

**University Of Maryland MUG**

326 Thomas Dr, #1  
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**Washington Apple Pi**

8227 Woodmont Ave, #207  
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9431 Georgia Ave  
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**Harford Community College Apple Users**  
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**Reisterstown Apple Users Group**  
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East Longmeadow, MA 01028  
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**Apple Core Berkshire County**  
14 Hutchinson Ln  
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**Apple Computer Clubs**  
175 Middlesex Turnpike  
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**Mitre Corp User Group**  
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384 N Main St  
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**Northeast Regional Exchange**  
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Chelmsford, MA 01824

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Boston, MA 02108

**Boston Mac User Group**  
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**Boston Computer Society**  
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**Computer Kids International**  
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**Apple Users Group Of Cape Cod**  
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**Ann Arbor Apple**  
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**Mactech Users Group**  
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**Southeastern Michigan Mac User**  
9720 Lakewood  
Grosseille, MI 48138

**Semco Mac Pac**  
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**Flint Apple Club**  
PO Box 460  
Flint, MI 48501

**Saginaw Apple Computer Klub**  
4465 Seidel  
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**Mac In Awe**  
1710 W St Andrews Rd  
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**Midland Apple Club**  
2908 Darby Ct  
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**Lansing Area Macintosh & Lisa**  
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Kentwood, MI 49508

**The Computer Shoppe**  
Downtown Plaza  
Iron Mountain, MI 49801

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1569 M-28 East  
Marquette, MI 49855

**Remc 1**  
600 Hecla St  
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**Copper MUG**  
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**St. Paul TVI**  
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**General Mills Home Computer**  
4433 Evergreen Dr  
Vadnais Hts, MN 55110

**Woodbury Computer Club**  
1852 Evergreen Draw  
Woodbury, MN 55125

**The Mac SIG**  
3M Company Design Specifications  
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St Paul, MN 55133

**3M Personal Computing Club**  
3M Center Building 236-3C  
St Paul, MN 55144

**Specialty Chem Lab 3M**  
236-3B-01  
3M Center  
St Paul, MN 55144

**Mini Apples**  
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**Racug**  
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Minneapolis, MN 55410

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**U Of M MUG**  
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Blaine, MN 55434

**Iron Range Apple Computer Club**  
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Hibbing, MN 55746

**Lake Superior Apple Users Group**  
16 W 1st St  
Duluth, MN 55802

**SMMUG**  
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Duluth, MN 55803

**Mayo Apple Users Group**  
Mayo Clinic-S&P  
Rochester, MN 55901

**Apple Users Group**  
PO Box 608  
Rochester, MN 55903

**RAM**  
Medical Oncology  
Mayo Clinic  
Rochester, MN 55905

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North Mankato, MN 56001

**Waseca Apple Users Group**  
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**Independent School District**  
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**Hattiesburg Apple Users Group**  
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Mississippi, MS 39762

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**Personal Computer Club Of St Louis**  
274 Brightfield Dr  
St Louis, MO 63001

**Crystal City Public Library**  
736 Mississippi Ave  
Crystal City, MO 63019

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11145 Suntree Rd, Apt D  
St Louis, MO 63138

**Apple Eye**  
777 S New Ballas, Ste 231E  
St Louis, MO 63141

**Apple Jacks Of St Louis**  
12 Jenney Lind Dr  
St Peters, MO 63376

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Kirksville, MO 63501

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209 Johnson  
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**Kansas City Mac User Group**

1828 Swift, #205  
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Joplin, MO 64801

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PO Box 55  
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**Apple Jac Macintosh Users Group**

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Jefferson City, MO 65101

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333 E Winter  
Columbia, MO 65201

**Sedalia Computer Club**

2316 W 5th St  
Sedalia, MO 65301

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Choteau, MT 59422

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Montana State University  
Bozeman, MT 59717

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Omaha, NE 68127

**Creighton University/BIO Information**

25th at California St  
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5521 Locust  
Lincoln, NE 68516

**Apple Line Computer Club**

1209 Garber Ave  
Lincoln, NE 68521

**Mid-America Research Chemical**

Corporation  
PO Box 927  
Columbus, NE 68601

**Big Red Apple Club**

1105 S 13th St, Ste 103  
Norfolk, NE 68701

**Computer Hardware**

2415 Central Ave  
Kearney, NE 68847

**Compuser's**

PO Box 2064  
Hastings, NE 68901

**McCook Community College**

1205 E 3rd  
McCook, NE 69001

**Dr's Of Macology**

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**North Platte Mac User Group**

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North Platte, NE 69101

**NEW HAMPSHIRE****Pemi-Baker Computer Users Group**

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Plymouth, NH 03264

**Big Green Apple Users Group**

1 Ledge Rd  
Hanover, NH 03755

**Labcom Users Group**

Mary Hitchcock Memorial Hospital  
Hanover, NH 03756

**Merrimac Macintosh User Group**

PO Box 51  
Hampstead, NH 03841

**NEW JERSEY****New Jersey Mac User Group**

PO Box 43205  
Upper Montclair, NJ 07043

**Amateur Computer Group Of NJ**

456 Henry St  
Scotch Plains, NJ 07076

**Short Hills Apple Pits**

29 Olive Hills Rd  
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**Essex County Mac Users Group**

PO Box 122  
South Orange, NJ 07079

**Bergen Apple Special Interest Club**

PO Box 1291  
Fair Lawn, NJ 07410

**U.S. Maps Computer Club**

U.S. Maps  
Attention: Academic Dept  
Fort Monmouth, NJ 07703

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50 River Dr  
Marlboro, NJ 07746

**Summit Mac Users Group**

12 Commerce St  
Chatham, NJ 07928

**Apple Jack**

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**Mac Users At Murray Hill**

600 Mountain Ave 7E, #419  
Murray Hill, NJ 07974

**South Jersey Mac Users**

221 Timothy Ct  
Cherry Hill, NJ 08034

**Southern NJ Apple Users Group**

16 Lavenham Ct  
Cherry Hill, NJ 08034

**Atlantic Apple Users Group**

20 Oak Ln  
Cardiff, NJ 08232

**Princeton Apple User Group**

PO Box 268  
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**Princeton MUG PMUG**

C-430 Engineering Quad  
Princeton University  
Princeton, NJ 08544

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PO Box 7660  
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**Manmouth Apple Corps**

332 River Ave  
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**Apple User Group**

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**Amateur Computer Group Of NJ**

5 Bayberry Close  
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**Apple Synapse II**

1050 George St, #5-0  
New Brunswick, NJ 08901

**Amateur Computer Group Of New Jersey**

698 Magnolia Rd  
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**NEW MEXICO****Computer Psyc Service**

101 Hospital Loop NE, #214  
Albuquerque, NM 87109

**Apple Querque Computer Club**

PO Box 35508  
Albuquerque, NM 87176

**RF Computer Club**

4108 Douglas  
Farmington, NM 87401

**NEVADA****South Nevada Apple Family Users Group**

4530 Meadows Ln  
Las Vegas, NV 89107

**Greater Reno Operating Group**

PO Box 1038  
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**NEW YORK****Apple User Group**

C/O Promon International Services  
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New York, NY 10022

**New York Users Group**

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New York, NY 10024

**CUMUG**

612 W 115 St, 8th Floor  
New York, NY 10025

**Computer Hebrew User Group**

21 Bennet Ave  
New York, NY 10033

**Computer Center**

33 W 42 St  
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**Apple User Group**

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375 Park Ave  
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**Big Apple User Group**

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**Staten Island Apple User Group**

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**South Salem User Group**

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35 Yale Dr  
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**Crab Apple**

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**Apple Power Users Group**

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**Apple Sauce**

141-08 71st Rd  
Flushing, NY 11367

**Apple Power Users Group**

89 Bethel Rd  
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West Hempstead, NY 11552

**MAVG**

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**Apple Power**

21 Ridgedale Ave  
Farmingville, NY 11738

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Middle School  
Shoreham, NY 11786

**Suffolk Apple Computer Club**  
171 Mt Pleasant Rd  
Smithtown, NY 11787

**Apple Power**  
26 Peter Ln  
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**Guilderland Apple Byters**  
15 Gert Ln  
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**Mid Hudson Micro Users Group**  
C/O CSS  
PO Box 1007  
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**Skidmore College MUG**  
PO Box 1649  
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**Cortland Computer Club**  
135 Parkway Gardens  
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**Syracuse Microcomputer Club**  
RR 1, Box 175  
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**The Apple Corps**  
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**Microcomputer Advisory Committee**  
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**Upstate Cider Mill**  
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**Rome Apple User Group**  
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**Potsdam College Macintosh**  
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427 Main St, #4A  
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**Springville-Griffith Institute**  
283 North St  
Springville, NY 14141

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42 Moller St  
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**Mac's 5th Ave User Group**  
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1435 Tudor Wy  
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**Apple Cider**  
294 Northland Ave  
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**Apple User Group**  
Admin/Dept of Medicine  
Rochester General Hospital, #11425  
Rochester, NY 14621

**Mac Users Group/University Of Rochester**  
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**Apple Ace Users Group**  
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**Southern Tier Apple Users**  
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**Lincoln County Schools**  
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**Charlotte Apple Computer Club**  
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**Charlotte Apple Computer**  
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**Mac Apple Core Of Wilmington**  
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1104 Old US 70 West  
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**Apple Achian User Group**  
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**Minot Macintosh Users**  
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755 E College Ave  
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**Standard Oil MUG**  
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**Neo Apple Corps**  
31481 Cedar Rd  
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**Stow Apple Core**  
4803 Southbrook Dr  
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**Mahoning Valley Apple Computer**  
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**Country Computer Club**  
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**Massillon Akron Canton**  
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**Apple-Dayton**  
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**Reed College Mac Users Group**  
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Waldport, OR 97394

**Eugene Mac/Lisa Users Group**  
1050 Ferry St, #606A  
Eugene, OR 97401

**Apple Blossom**  
199 N Prairie St  
Dillard, OR 97432

**The Eugene Macintosh Group**  
PO Box 10988  
Eugene, OR 97440

**Rogue Apple Users Group**  
PO Box 217  
Medford, OR 97501

**Mac Users of the Rogue Valley**  
181 Rustic Canyon Dr  
Grants Pass, OR 97526

**Rogue Apple Computer Enthusiasts**  
481 California Ave  
Grants Pass, OR 97526

## PENNSYLVANIA

**Apple Pitts**  
Woodland Rd  
Bradford, PA 15015

**CMU-MUG**  
138 Heather Dr  
Monroeville, PA 15146

**Carnegie-Mellon MUG**  
Skibo #103  
Pittsburgh, PA 15213

**Central Lab Services Children's Hospital**  
125 De Soto St  
Pittsburgh, PA 15213

**Fortune Corporation Mac Users**  
2325 Collins Rd  
Pittsburg, PA 15235

**Pitt Macintosh User Group**  
University of Pittsburgh  
Pittsburgh, PA 15260

**University of Pittsburgh**  
Student Microcomp Users, 5th Floor  
Pittsburgh, PA 15260

**Waynesburg College Applers**  
Math & Computer Science Dept  
Waynesburg, PA 15370

**Monroeville Apple Users Group**  
Box 124  
Hiller, PA 15444

**Apple Butler Users Group**  
Box 39, Meridan Station  
Butler, PA 16001

**Erie Apple Crunchers**  
PO Box 1575  
Erie, PA 16507

**Macintosh User Group**  
115 Main St  
Bradford, PA 16701

**Pennsylvania Apple Microcomputer**  
454 Galen Dr, #3  
State College, PA 16803

**Pennsylvania Apples**  
PO Box 778  
Lemont, PA 16851

**Penn MUG**  
PO Box 952  
Carlisle, PA 17013

**Hershey Apple Core**  
PO Box 634  
Hershey, PA 17033

**Keystone Apple Core**  
4644 Carlisle Pke  
Mechanicsburg, PA 17055

**Carnegie-Mellon Mac Users Group**  
Box 661  
5155 Margaret Morrison  
Pittsburgh, PA 17213

**Hoffman Home for Youth**  
Box 1187  
Gettysburg, PA 17325

**Lancaster County Apple Corps**  
PO Box 96  
Lititz, PA 17543

**The Lancaster County Apple Core**  
1706 Hempstead Rd  
Lancaster, PA 17601

**Franklin & Marshall College**  
Box 1509  
Lancaster, PA 17604

**Apple User Of Pennsylvania**  
29 S New Ardmore Ave  
Broomall, PA 19008

**Apple Users Group Computer Society**  
PO Box 411  
Horsham, PA 19044

**CPA Computer Users Group**  
PO Box 56  
Narberth, PA 19072

**D Users Group**  
32nd & Chestnut  
Philadelphia, PA 19104

**Penn MUG**  
1202 Blockley Hall  
Philadelphia, PA 19104

**Apple Users Group Computer Society**  
20th Omnley St  
Philadelphia, PA 19141

**Chester County Computer Club**  
Normandy Cir  
Glenmoore, PA 19343

**Delaware Valley Apple Branch**  
523 Cherry St  
Norristown, PA 19401

**Sperry Apple Computer Club**  
PO Box 500 E2 120  
Blue Bell, PA 19424

**Berks Apple Club**  
720 Warren St  
Reading, PA 19601

## RHODE ISLAND

**Rhode Island Apple Core**  
126 Slater Park Ave  
Pawtucket, RI 02861

**TCS Mac Users Group**  
740 N Main St  
Providence, RI 02904

**Brown University Mac User Group**  
Box D  
Providence, RI 02912

## SOUTH CAROLINA

**Central Carolinas Apple Users Group**  
1106 Haven Dr  
Columbia, SC 29209

**Lowcountry Apple Corps**  
1660 San Rittenberg Blvd  
Charleston, SC 29407

**Lowcountry Apple Corps**  
313 Hawthorne St  
Mount Pleasant, SC 29464

**Greenville Apple Users Group**  
77 La Vista Apts  
Greenville, SC 29609

**Clemson Apple Users Group**  
Clemson University Math Dept  
Clemson, SC 29631

**Apple User Group of CSRA**  
1469 Canterbury Ct  
Aiken, SC 29801

## SOUTH DAKOTA

**Team Mac**  
PO Box 203  
Yankton, SD 57078

**Yankton Area Club**  
PO Box 203  
Yankton, SD 57078

**Sioux Falls Public Library**  
201 N Main Ave  
Sioux Falls, SD 57120

## TENNESSEE

**Quacks**  
PO Box 2813  
Clarksville, TN 37042

**Mac Intersteds**  
2305 Elliston Pl  
Nashville, TN 37203

**Nashville MUG**  
2305 Elliston Pl, #C-5  
Nashville, TN 37203

**Music City Apple Core**  
2120 Crestmoor Ste 333  
Nashville, TN 37215

**University of Tennessee at Chattanooga**  
Curriculum Instruction, Hunter 313  
Chattanooga, TN 37403

**Tristate Apple Club**  
2532 Hickory Ridge Dr  
Chattanooga, TN 37421

**Holston Apple Computer Club**  
PO Box 5951  
Kingsport, TN 37663

**Oak Ridge Mac Users Group**  
Rt 2, Box 65E  
Oliver Springs, TN 37840

## TEXAS

**Technical Support**  
1303 Marshlane 115014  
Carrollton, TX 75011

**Apple Corps**  
PO Box 5537  
Richardson, TX 75080

**The Mac Pack**  
PO Box 834097  
Richardson, TX 75083

**Young People's Logo Association**  
1208 Hillsdale Dr  
Richardson, TX 75081

**Inotek Corporation/Apple Corp of Dallas**  
11212 Indian Trail  
Dallas, TX 75229

**Micro Apple Core**  
3920 Carauth Blvd  
Dallas, TX 75225

**Apple Computer**  
12770 Merit Dr, Ste 1000  
Dallas, TX 75251

**FYI (For Your Information)**  
PO Box 743826  
Dallas, TX 75374

**East Texas Computerists**  
10613 Old Mill Rd  
Greenville, TX 75401

**Beautiful East Texas Area Mac Users**  
1601 Cindy Lou  
Henderson, TX 75652

**Beta Macs**  
116 Pine St  
Henderson, TX 75652

**Macintosh User Group**  
116 Pine St  
Henderson, TX 75652

**Tyler Area Macintosh Users**  
522 E Frazier  
Tyler, TX 75701

**Iconcepts**  
PO Box 1936  
Athens, TX 75751

**Tyler Apple Group**  
Rt 1, Box 285  
Flint, TX 75762

**Nac Mac Users Group**  
4304 Friar Tuck  
Nacogdoches, TX 75961

**Mid Cities Mac Group**  
1209 Glenn  
Euless, TX 76039

**Apple Dynamics**  
PO Box 748 Mz2212  
Fort Worth, TX 76101

**Education Services Central Region XI**  
3001 N Freeway  
Fort Worth, TX 76106

**Tarrant Apple Group**  
3262 Olive Pl  
Fort Worth, TX 76116

**Gainsville Middle School**  
421 Denton St  
Gainsville, TX 76240

**Apple Tree**  
2805 Del Norte  
Temple, TX 76502

**Apple Stem**  
PO Box 1508  
Coppeas Cove, TX 76522

**H.O.T.-Apple-P.I.E.**  
2321 Lee St  
Waco, TX 76711

**Rice Mac Users Group/ICSA**  
Rm 225, Mudd Lab  
6100 S Main St  
Houston, TX 77005

**UH MUG**  
School of Communication  
University of Houston  
Houston, TX 77004

**Coffee MUG**  
4831 Spellman  
Houston, TX 77035

**NASA User Group**  
12817 Gulf Freeway  
Houston, TX 77034

**HAAUG**  
PO Box 610150  
Houston, TX 77208

**Coldspring High School**  
PO Box 39  
Coldspring, TX 77331

**The Memorial Northwest Apple**  
8416 Crescent Wood Ln  
Spring, TX 77379

**Hardin Jefferson Independent School District**  
PO Drawer C  
Sour Lake, TX 77659

**Golden Apple Computer Club**  
1975 Sams Wy  
Beaumont, TX 77706

**A & M User Group**  
PO Box 5678  
College Station, TX 77844

**Texas A & M Macintosh Users Group**  
Dept of Entomology  
College Station, TX 77843

**New Braunfels Apple Users Group**  
165 Bobolink  
New Braunfels, TX 78130

**Mac Enthusiasts of San Antonio**  
PO Box 29000, #219  
San Antonio, TX 78229

**Apple Corpus**  
5808 Wicklow Dr  
Corpus Christi, TX 78413

**Parkdale Apple Club**  
4826 Goldeneye  
Corpus Christi, TX 78413

**Mac Products Users Group**  
2501 Leon St  
Austin, TX 78705

**River City Apple Corps**  
Box 13449  
Austin, TX 78711

**Apple Info & Data Exchange**  
PO Box 30878  
Amarillo, TX 79120

**Maclubb**  
4214 88th Pl  
Lubbock, TX 79423

**Midland Apple User's Group**  
1301 Daventry  
Midland, TX 79705

**Apple Pi Of The Permian Basin**  
415 E 43rd St  
Odessa, TX 79762

**Mac Miners**  
412 Pocano Ln  
El Paso, TX 79912

**El Paso Mac User Group**  
5534 Ketchikan  
El Paso, TX 79924

**Franklin Mountain Apple Orchard**  
PO Drawer G  
El Paso, TX 79951

## UTAH

**User Group**  
General Delivery  
Hill AFB, UT 84056

**BYU Apple User Group**  
636 E 100 N  
Orem, UT 84057

**Intermountain Mac Users Group**  
C/O Ad Venture Graphics  
Salt Lake City, UT 84115

**Mac Users Group**  
University of Utah Computer Center  
3116 Merrill Engineering Building  
Salt Lake City, UT 84112

**University of Utah Mac Users Group**  
239 Whidtsoe Building  
Salt Lake City, UT 84112

**University of Utah Macintosh Users**  
218 Stewart Building  
Salt Lake City, UT 84112

**Apple Slice**  
PO Box 11246  
Salt Lake City, UT 84147

**Utah State University Mac User Group**  
Utah State University  
Logan, UT 84321

**Ogden Apple Users Group**  
PO Box 4035  
Ogden, UT 84403

**BYU Mac Users Group**  
201 MCKB  
Brigham Young University  
Provo, UT 84602

**Canyon Country Apple Users Grp**  
Capitol Reef National Park  
Torrey, UT 84775

**Tri-State Mac Users Group**  
Box 241  
Townshend, UT 85353

## VIRGINIA

**Northern Virginia Apple Users**  
PO Box 8211  
Falls Church, VA 22041

**Shenandoah Macintosh Users Group**  
15 Southgate Ct  
Harrisonburg, VA 22801

**Midlothian HS Computer Club**  
401 Charter Colony Pkwy  
Midlothian, VA 23113

**TATR**  
1520 Grove Ave  
Richmond, VA 23220

**Tidewater Area MUG**  
5313 Marlinton Dr  
Virginia Beach, VA 23462

**Micor Md**  
6389 Colby Wy  
Virginia Beach, VA 23464

**Tidewater Apple Worms**  
3025 Vendome Terr  
Norfolk, VA 23509

**Peninsula Apple Core**  
PO Box 6384  
Newport News, VA 23606

**Club Macintosh of Hampton Roads**  
PO Box 7105  
Hampton, VA 23666

**Macintosh User Group of Roanoke**  
PO Box 13905  
Roanoke, VA 24038

**Jonesville DECA Club**  
PO Box 160  
Jonesville, VA 24263

**Lynchburg Apple Corps**  
PO Box 2073  
Lynchburg, VA 24501

**Danville Apple User Group**  
Averett College  
Danville, VA 24541

**Sweet Briar College Macintosh**  
Box 73  
Sweet Briar, VA 24595

## VERMONT

**Green Mountain Apple Club**  
13 Clemens Dr  
Essex Junction, VT 05452

## WASHINGTON

**32 Little Apples**  
PO Box 536  
Edmonds, WA 98020

**A.P.P.L.E.**  
21246 68th Ave S  
Kentucky, WA 98032

**Kirkland Junior High School**  
413 18 Ave  
Kirkland, WA 98033

**A.P.P.L.E. Washington**  
290 SW 43rd St  
Renton, WA 98055

**Macintosh Downtown Business Users**  
PO 3463  
Seattle, WA 98114

**DBug**  
6743 Beach Dr SW  
Seattle, WA 98136

**Macdub-Center F/Soc/Science & Research**  
MS Dk45  
University Of Washington  
Seattle, WA 98195

**Kitsap Apple Users Group**  
7265 Thasos Ave NE  
Bremerton, WA 98310

**Boeing Employees Computer Society**  
19206 78th St Lane E  
Sumner, WA 98390

**Ups MUG**  
1500 N Warner  
Tacoma, WA 98416

**Northwest Apple Pickers**  
PO Box 98808  
Tacoma, WA 98498

**Evergreen Macintosh User Group**  
3138 Overhulse Rd, #164  
Olympia, WA 98502

**Kelso High School**  
1904 Allen St  
Kelso, WA 98626

**Apple \* Van**  
PO Box 2221  
Vancouver, WA 98668

**Macintosh Owners & Users Society**  
704 N Water, Apt 1  
Ellensburg, WA 98926

**Yakima Area Macintosh Users**  
1304 Stassen Wy  
Grandview, WA 98930

**Palouse Area Microcomputer Association**  
Physics Dept  
Washington State University  
Pullman, WA 99164

**Macintosh Apple Club of Spokane**  
N 1010 Bates  
Spokane, WA 99206

**AU**  
12816 E Desmet  
Spokane, WA 99216

**Computer Literacy & Support Society**  
PO Box 335  
Pomeroy, WA 99347

## WISCONSIN

**Apple Users Group**  
28 S Church St  
Oconomowoc, WI 53066

**Lakeshore Apple Corps**  
4160 S 12th St  
Sheboygan, WI 53081

**Double Click**  
8336 Parkridge Ct W  
Greendale, WI 53129

**Wisconsin Apple User Group**  
PO Box 05078  
Milwaukee, WI 53205

**The R.A.C.I.N.E. User Group**  
725 Arthur Ave  
Racine, WI 53405

**United Methodist Churches**  
PO Box 58  
Livingston, WI 53554

**Madison Macintosh Users Group**  
PO Box 1522  
Madison, WI 53706

**Ansul Apple User Group**  
One Staton St  
Marinette, WI 54143

**Random Apple Members**  
1821 Aspen Ln  
Green Bay, WI 54303

**UWSP Apple Users Group**  
Box 21  
University Center  
Stevens Point, WI 54481

**La Crosse Apple Users Group**  
PO Box 1804  
La Crosse, WI 54601

**Chi-Hi Computer Club**  
Coleman & Terrill St  
Chippewa Falls, WI 54729

**Menomin-Apples**  
1521 6th Ave E  
Menomonie, WI 54751

**Fox Valley Crab Apples**  
University Of Wisconsin  
Oshkosh, WI 54901

**Appleton Apples**  
PO Box 2785  
Appleton, WI 54913

**WVU Medical Center**  
Dept of Ophthalmology  
Morgantown, WV 26506

## WYOMING

**The Apple Net**  
2203 Park Ave, Orchard Valley  
Cheyenne, WY 82001

**Sheridan Microcomputer User Group**  
PO Box 142  
Sheridan, WY 82801

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## Attention Programmers

*COMPUTE!'s Apple Applications Special* is looking for quality submissions from Apple and Macintosh programmers. If you've got an outstanding game, application, utility, or programming tutorial for the Apple II series or the Macintosh, send it to the Editor, *Apple Applications Special*, 324 W. Wendover Ave., Suite 200, Greensboro, NC 27408.

We are particularly interested in seeing programs that take advantage of the Apple IIGS's graphics and sound capabilities.

All programs must be written in BASIC or assembly language, and should be submitted on disk. Documentation and instructions should also be included in the submission.

## More Apple Programs

COMPUTE! magazine, published monthly, covers a wide range of personal computers, including the Apple II line. Each month you'll find Apple-specific programs within the pages of COMPUTE!. Some of the programs which have appeared in past issues include *SpeedScript*, a word processor; "SpeedCalc," an all machine language spreadsheet; "Guardian Angel" and "ProDOS Protector," programs that protect disks against unauthorized copying; and "Miami Ice," an arcade game of slick ice and driving skill.

Look for the COMPUTE! magazine subscription information in this issue.

# New Products

## Macintosh Flight Simulator

The popular *Flight Simulator* program is now available for the Macintosh personal computer. Developed by SubLogic, the program has been released by Microsoft Corporation. Computer pilots can fly two different aircraft—a Cessna 182 and a Gates Learjet 25G—and take off and land at 118 detailed airports. A World War I flying-ace game is also included.

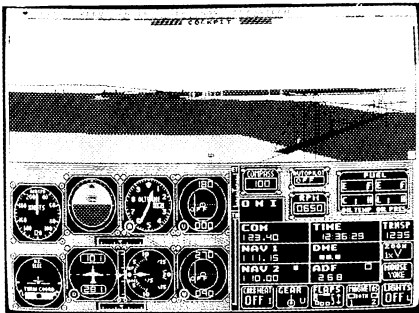
Five scenery databases add rich visual images. Besides the familiar Seattle-Tacoma, Chicago, Los Angeles, and New York scenic routes, the Macintosh version includes the San Francisco-Oakland area. Buildings, landscapes, and scenery are drawn in three-dimensional solid shapes with depth and shading.

Pilots can view a flight from three different perspectives—from the cockpit, the control tower, or a spotter plane. Multiple windows can be active on the screen so that pilots can watch any two of these views, plus a map and the control panel.

*Flight Simulator* runs best on Macintoshes with 512K or more of memory. The package is priced at \$49.95.

Microsoft Corporation, 16011 NE 36th Way, Box 97017, Redmond, WA 98073.

Circle Reader Service Number 168.



Approaching San Francisco over the Golden Gate Bridge in Macintosh Flight Simulator.

## Apple II Telecommunications

PBI Software has released *CommWorks*, a new telecommunications software package for the Apple IIe and IIc. *CommWorks* uses the same file folder/menu-style interface as *AppleWorks*. Communication files can

be created and saved for each bulletin board or service accessed. Up to 18 macros of 32 characters each can be created for every communications file to automate repetitive tasks such as entering passwords and ID numbers. An automatic log-on facility can automatically dial, enter passwords and ID's, and execute commands—all at the press of a single key.

*CommWorks* also includes a powerful text editor so that documents can be modified or generated without needing a separate word processor program. Disk utilities allow disk formatting, subdirectory creation, and file deletion while still online. The program supports full ProDOS/*AppleWorks* file transfers and XMODEM transfers.

*CommWorks* has a suggested retail price of \$95.

PBI Software, 1111 Triton Dr., Foster City, CA 94404.

Circle Reader Service Number 169.

## Mac Music

*Studio Session*, a six-track music composition program for the Macintosh, was recently released by MacNifty Central. Developed by Ed Bogus, an award-winning composer of advertising jingles and animated television soundtracks, *Sound Studio* offers a six-channel editor, a six-track player, and two disks containing 91 digitized sound sources. Both the editor and player take full advantage of the Macintosh interface. Though digitally sampled sound can be created with the program, no MIDied synthesizer is necessary. Music can be played through the Macintosh's built-in speaker or through an external system.

The three-disk *Studio Session* package is priced at \$89.95.

MacNifty Central, 6860 Shingle Creek Pkwy., Suite 110, Minneapolis, MN 55430.

Circle Reader Service Number 170.

## Personal Choice Productivity

Activision has introduced a new line of personal productivity software for home, school, and small-business use called *Personal Choice Software*. The first products in the line include *Writer's Choice*, *Filer's Choice*, and

*Planner's Choice*.

*Writer's Choice*, a word processing and writing assistant, provides extensive writing and editing features, including a 50,000-word spelling checker, help screens, and a full-layout preview option. *Filer's Choice* allows for tailor-made computer "index cards" and either alphabetical or numerical record sorting. A report writer takes information from multiple fields and combines it into one file for report generation and document production. *Planner's Choice* is a personal planning and spreadsheet system with variable column width, as well as horizontal and vertical windowing for simultaneous viewing of different spreadsheet sections. The program also includes "what-if" games for experimentation and modification of numerical data.

The Apple II versions of each program retail for \$49.95 individually, or \$119.95 as a package.

Activision, 2350 Bayshore Frontage Rd., Mountain View, CA 94043.

Circle Reader Service Number 171.

## Ready-To-Print Certificates

Now you can print just about any certificate, award, diploma, or license you want with Springboard Software's *Certificate Maker*. This new software package for the Apple II series provides more than 200 pre-designed certificates in a variety of categories, such as sports, academic achievement, family life, children, religion, and business. They can be serious awards or humorous licenses.

Select the style, choose a border, enter your personalized message with any of a number of typefaces and sizes, fill in the signature and date line, and print out your completed masterpiece. You can also embellish your piece with more than three dozen seals and stickers.

*Certificate Maker* also lets you create a name file that allows automatic printing of any given certificate for a list of students, employees, team members, and others.

Suggested retail price is \$49.95.

Springboard Software, 7808 Creekridge Circle, Minneapolis, MN 55435.

Circle Reader Service Number 172.



**FileMaker Plus Screenshot: ORDERS Form**

**Designs on You™**  
Custom-made entertainment centers

2445 Shady Oaks Blvd.  
Woodside, CA 91122  
Phone: 415/987-1234

Records: 10

Order # 101    Ordered 1/31/86    Balance Paid 3/4/86

Name Mr. and Mrs. John C. Jameson  
Address 1234 Main Street  
City San Bruno    State CA  
Zip 94433    Phone 415/978-9999

Design for this Customer

Model	Royal	Amount	494.95
Price	399.95	Tax	34.65
Wood	oak	Deposit	100.00
Finish	oiled	Balance	\$429.60

EXTRAS  
Dropleaf \$95: 95.00  
Pullout Shelf \$85:  
TV Turntable \$45:

FileMaker Plus allows users to design their own forms and reports including text, graphics, calculations, and picture fields.

### Flexible Form Design

Powerful database management has been combined with flexible forms design to create *FileMaker Plus*, a recently released Macintosh product from Forethought. The program is designed for business users who want to manage information and use that data to produce a variety of professional-looking forms and reports.

Based on the earlier *FileMaker 1.0*, this program offers many new features, including picture fields and automated scripts (macros) for quick execution of repetitive tasks. A set of business templates for common applications—such as mail-list management, invoices, purchase orders, expense reports, and form letters—are included with the software.

Data can be exchanged with programs like *Excel*, *Word*, *Jazz*, *MacPaint*, and *MacDraw*. Forms and reports can be designed on the screen in almost limitless patterns and styles.

*FileMaker Plus* retails for \$295 (\$75 for owners of *FileMaker 1.0*) and requires a Macintosh 512K or Macintosh Plus.

Forethought, 250 Sobrante Way, Sunnyvale, CA 94086.

Circle Reader Service Number 173.

### Idea Processing

*Calliope*, Innovision's newest product, is an idea processor and thought organizer with versions for the Apple IIe, IIc, and Macintosh. Ideas are displayed on the main screen as light-bulb-like icons. Each icon, in turn, represents a text window where the user can develop thoughts more fully in a *MacWrite*-style environment.

Related ideas can be linked by drawing connecting lines between icons. At any time, the entire creation can be printed or saved to disk by selecting the lead idea in each connected cluster. Further editing with a traditional word processor can then be done.

The Apple II version retails for \$49.95, while *Calliope* for the Macintosh sells for \$59.95. Special "lab packs" are available for educational institutions.

Innovision, P.O. Box 1317, Los Altos, CA 94023.

Circle Reader Service Number 174.

### Electronic Arts' Seven For The Apple

Electronic Arts has introduced seven new programs for the Apple II line, ranging from fantasy adventures and strategy games to adult party games.

Thomas M. Disch's *Amnesia* (\$44.95) is an interactive text adventure written by the award-winning

science fiction author. *Battlefront* (\$39.95) is a recreation of land battles from World War II, including four separate scenarios and an easy-to-use design kit. *Chessmaster 2000* (\$39.95) is a powerful chess program featuring 12 different skill levels and optional 3-D perspective. In *Murder Party* (price TBA), you host your own murder parties of up to seven people; variable culprits and clues are included for a new party each time. *Ogre* (\$39.95) is the computer version of the popular board game. *Timothy Leary's Mind Mirror* (\$34.95), designed by Dr. Timothy Leary, is part tool, part game, and part philosopher. And in *Scavenger Hunt* (price TBA), up to four players use animated robots to hunt for strange items like the digital donut or the transistor taco.

Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404.

Circle Reader Service Number 175.

### Play Ball!

Accolade has announced an Apple Macintosh version of its popular baseball arcade game *Hardball*. The game features high-quality graphics, sound, and animation. Three-dimensional perspectives show the playing field, and up to six different pitches can be thrown by either a right- or left-handed pitcher. Managerial decisions can range from intentionally walking a player to bunting, base stealing, and substitutions. The suggested retail price of the Macintosh version of *Hardball* is \$44.95.

An Apple II version of the game is also available and is priced at \$34.95.

Accolade, 20833 Stevens Creek Blvd., Cupertino, CA 95014.

Circle Reader Service Number 176.

### Minnie, Mickey, Goofy, Donald, And Friends

Bantam Electronic Publishing has released two Walt Disney-based productivity software packages for Apple II-series computers. *Walt Disney Comic Strip Maker* lets children, ages seven and up, design and write their own comic strips. Children can choose from among 180 hi-res color graphics of Disney characters, as-

# New Products

sorted backgrounds, and objects, then transpose, crop, mix, and match them. Original or preprogrammed phrases can be used in balloons to create a strip, which can be printed out in color or black and white.

The second release, *Walt Disney Card & Party Shop*, allows children or parents to design, create, and print a variety of greeting cards, invitations, place cards, and wrapping paper by using more than 45 precreated designs or by choosing characters and objects to generate a personalized product. Three character-based party sets, ready to print out, are included.

*Walt Disney Card & Party Shop* and *Walt Disney Comic Strip Maker* each retail for \$39.95.

Bantam Electronic Publishing, 666 Fifth Ave., New York, NY 10103.  
Circle Reader Service Number 166.

## Popular Action/Strategy Game Available For Apple

Firebird has announced the availability of an Apple version of *Elite*, an arcade/strategy game which has enjoyed tremendous popularity with Commodore owners. *Elite* requires the player to use logical thinking skills as he or she explores the frontier of deep space, trading and doing business with other colonists, and reinvesting profits into additional weaponry for a Cobra space cruiser. The program comes with a Space Trader's Flight Training Manual, a novella that sets the scene for the game, a Quick Key Control Guide, and Ship Identification Chart.

*Elite* retails for \$39.95.

Firebird Licensees, P.O. Box 49, Ramsey, NJ 07446.

Circle Reader Service Number 167.

## Hard Disk For Mac Plus

Univation has announced the availability of the SlimLine Hard Disk Subsystem for the Macintosh Plus.

The SlimLine, designed to take advantage of the new Small Computer System Interface (SCSI) expansion port, offers both a hard disk and Winchester removable cartridge, providing the speed of a hard disk and convenience of removable car-

tridges. The subsystem offers a 10-megabyte removable cartridge hard disk mounted vertically below a 20- or a 30-megabyte fixed Winchester hard disk drive. Both drives are mounted inside a reverse L-shaped enclosure that also serves as a base for the Macintosh. The SlimLine Subsystem's removable cartridge can be used for protecting high-security data, backing up sensitive data, off-loading specialized databases, safeguarding confidential information, or storing archives.

Prices for the SlimLine Hard Disk Subsystem begin at \$2,795.

Univation, 1037 N. Fair Oaks Ave., Sunnyvale, CA 94089.

Circle Reader Service Number 177.

## Social Studies Software

CBS Interactive Learning has announced *Continents and Countries*, a new educational program designed for grades 5-12. The program helps students build and test their knowledge on the nations and peoples of the world through self-paced learning activities. Its database covers over 140 countries and includes facts on each nation's major religion, language, per capita income, land area, form of government, and population. *Continents and Countries* comes with the EasyKey keyboard overlay for quick and easy access to all program activities. For the Apple II series with 48K RAM, it retails for \$49.95 (Lab Pack for classroom use is \$149.85).

CBS has also launched a new line called The Novel Approach, a series of programs focusing on popular literary classics frequently studied in junior and senior high school. Serving as a supplementary learning aid, the programs are designed to help students enhance their appreciation of literature and build critical reading skills. Each program helps students focus on character motivation, plot development, symbolism, narrative techniques, and vocabulary. The first offering in the series, *Lord of the Flies*, retails for \$59.95 (Lab Pack for classroom use is \$179.85).

CBS Interactive Learning, One Fawcett Pl., Greenwich, CT 06836.

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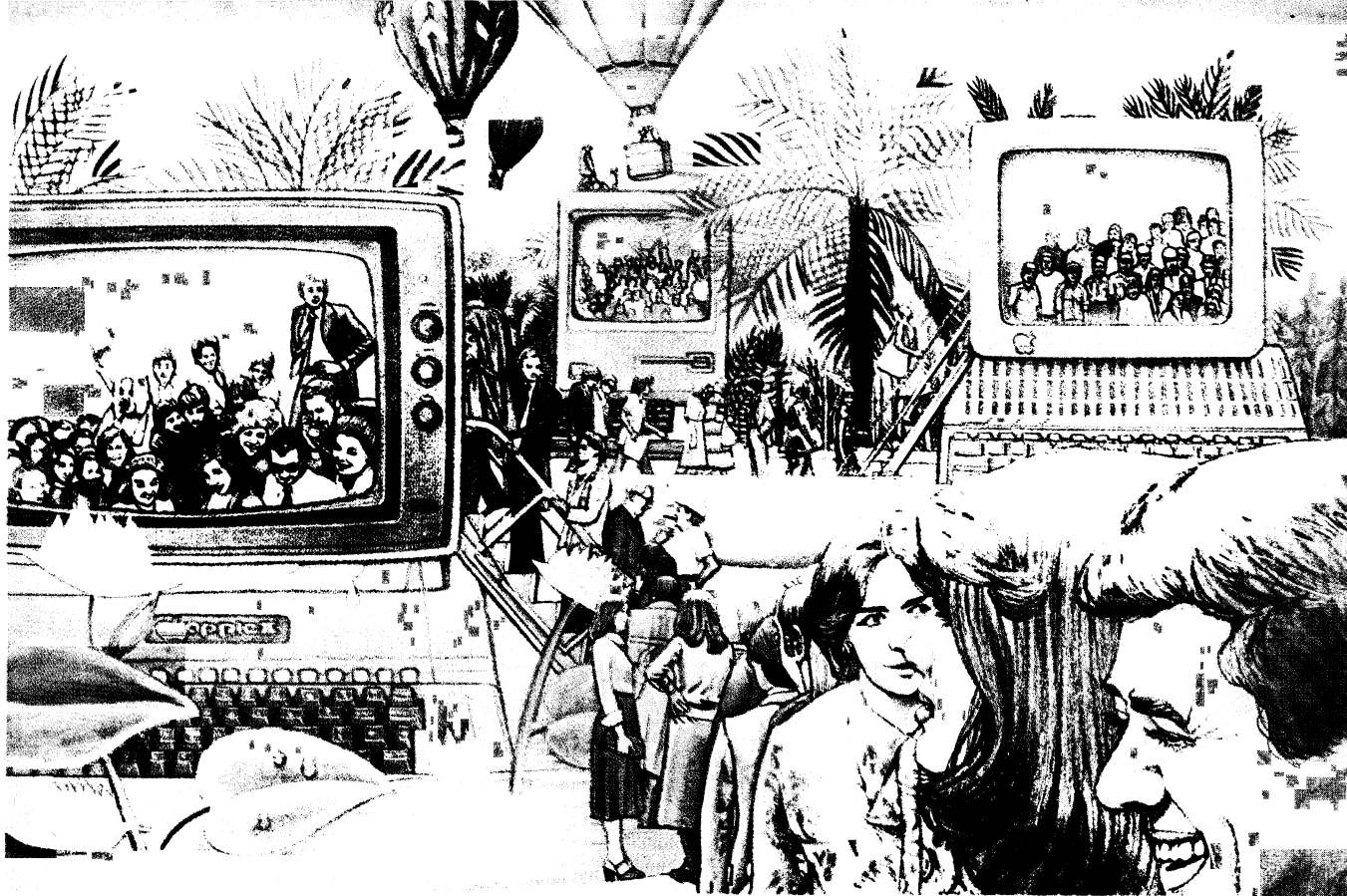
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